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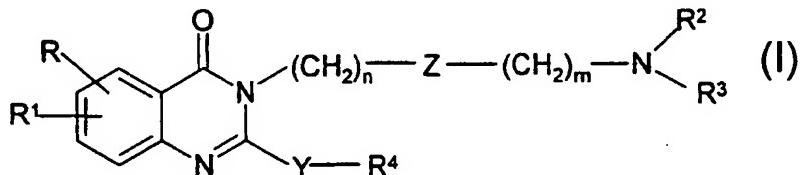
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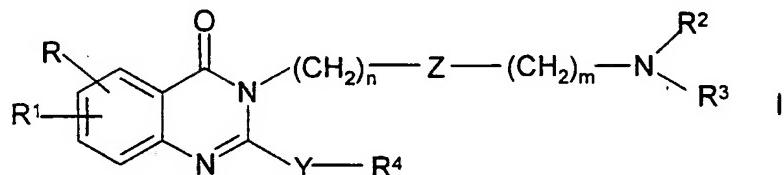


(57) Abstract: Quinazolinones of formula (I) in which R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, Y, Z, n and m have the meaning indicated in Patent Claim 1, and their salts or solvates as glycoprotein lbIX antagonists.

### Quinazolinones

The invention relates to substituted quinazolinones of the formula I

5



in which

- 10      R and R<sup>1</sup>    are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,
- 15      R<sup>2</sup> and R<sup>3</sup>    are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid phase,
- 15      R<sup>4</sup>          is Ar, cycloalkyl, phenylalkyl or Het,
- 15      Y             may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,
- 15      Z             may be absent and, if present, is phenylene,
- 15      A             is unbranched or branched alkyl having 1 to 6 carbon atoms,
- 20      Ar            is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,
- 25      Het           is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by
- 30      by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>,

NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

5      Hal      is F, Cl, Br or I,

n      is 1, 2 or 3,

m      is 0, 1, 2 or 3,

with the proviso

if Z and Y are absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,  
if Z and Y are absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl and R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,  
if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are ethyl,  
15      then R or R<sup>1</sup> is not NH<sub>2</sub>,

if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl, alkoxyphenyl or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A,  
and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl  
and their pharmaceutically tolerable salts and solvates.

20

Similar compounds having a quinazolinone parent structure as a combinatorial library are disclosed in WO 98/11438. W.D. Dean et al, J. Het. Chem. 1982, 1117-24 and L. Legrand et al, Bull. Soc. Chim. Fr. 1976, 1853-6 describes methods for the synthesis of similar quinazolinone compounds. Further similar compounds having a quinazolinone parent structure are disclosed in EP 0169537 and US 3,558,610.

The invention is based on the object of finding novel compounds having valuable properties, in particular those which can be used for the 30 production of medicaments.

It has been found that the compounds of the formula I and their salts or solvates have very valuable pharmacological properties together with good tolerability.

They act especially as GPIbIX inhibitors, in particular inhibiting the  
5 interaction of this receptor with the ligand von Willebrand factor (vWF). This action can be demonstrated, for example, by a method which is described by S. Meyer et al. in J. Biol. Chem. 1993, 268, 20555-20562. The property as GPIbIX alpha-thrombin receptor (N.J. Greco, Biochemistry 1996, 35, 915-921) can also be blocked by the compounds mentioned.

10 The significance of GPIbIX as an adhesion receptor on platelets, which mediates the primary interaction of platelets with an arteriosclerotically modified vascular wall via binding to the vWF expressed there, has been described by many authors (e.g. Z.M. Ruggeri in Thromb. Hemost. 1997,  
15 78, 611-616). The activation of another platelet adhesion receptor, GPIIbIIIa, following the GPIbIX-vWF interaction, leads to platelet aggregation and thus to thrombotic vascular occlusion.

20 A GPIbIX antagonist can thus prevent the start of thrombus formation and thus also release of active substances from the platelets which, for example, promote thrombus growth and have an additional trophic action on the vascular wall. This has been shown with inhibitory peptides or antibodies in various experimental models (e.g. H Yamamoto et al., Thromb. Hemost. 1998, 79, 202-210).

25 In the case of higher shear forces, the blocking action of GPIbIX inhibitors exerts its maximum effect, as described by J.J. Sixma et al. in Arteriosclerosis, Thrombosis, and Vascular Biology 1996, 16, 64-71. According to the flow chamber method used there, the compounds of the  
30 formula I can be characterized as GPIbIX inhibitors in whole blood.

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The inhibition of thrombus formation of the GPIbIX inhibitors can be measured by a modified Born method (Nature 1962, 4832, 927-929) using botrocetin or ristocetin as an aggregation stimulant.

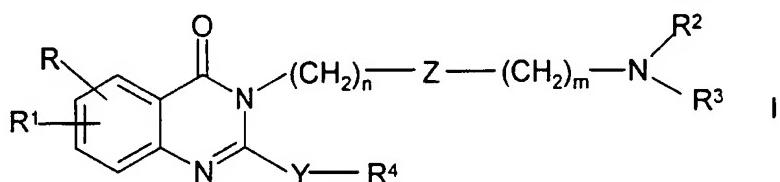
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The compounds of the formula I according to the invention can therefore be employed as pharmaceutical active compounds in human and veterinary medicine. They act as adhesion receptor antagonists, in particular as glycoprotein IbIX antagonists, and are suitable for the prophylaxis and/or therapy of thrombotic disorders and sequelae deriving therefrom. The preferentially best action is to be expected in the case of thrombotic disorders in the arterial vascular system, but GPIbIX inhibitors also have an effect in the case of thrombotic disorders in the venous vascular bed. The disorders are acute coronary syndromes, angina pectoris, myocardial infarct, peripheral circulatory disorders, stroke, transient ischaemic attacks, arteriosclerosis, reocclusion/restenosis after angioplasty/stent implantation. The compounds can furthermore be employed as anti-adhesive substances where the body comes into contact with foreign surfaces such as implants, catheters or cardiac pacemakers.

10  
15  
20

Therefore, the invention relates further to compounds of the formula I

25



in which

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

30

- 5 -

- R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid phase,
- R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,
- Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,
- 5 Z may be absent and, if present, is phenylene,
- A is unbranched or branched alkyl having 1 to 6 carbon atoms,
- Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,
- 10 Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl
- 15 20 which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>
- Hal is F, Cl, Br or I,
- n is 1, 2 or 3,
- 25 m is 0, 1, 2 or 3,
- with the proviso
- if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are ethyl, then R or R<sup>1</sup> is not NH<sub>2</sub>,
- if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl, alkoxyphenyl
- 30 or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A,

- 6 -

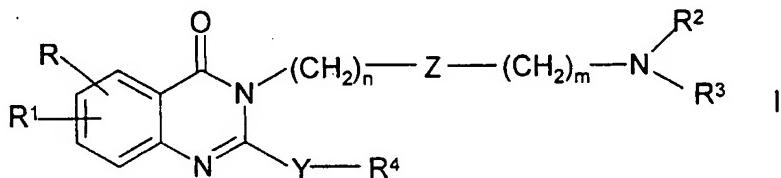
and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl  
and their physiologically acceptable salts or solvates as pharmaceutical  
active compounds.

- 5      The invention relates to compounds of the formula I according to Claim 4  
and their physiologically acceptable salts or solvates as glycoprotein IbIX  
antagonists.

10     Comparison medication introduced onto the market which may be  
mentioned are aspirin and GPIIbIIIa antagonists.

The invention relates to the compounds of the formula I of claim 1 and their  
salts or solvates, and to a process for the preparation of the compounds of  
the formula I

15



in which

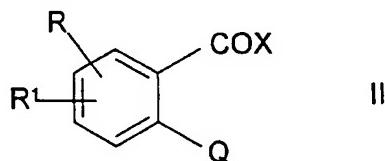
- 20     R and R<sup>1</sup>    are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal,  
NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>,  
COOH, COOA or SO<sub>2</sub>A,  
R<sup>2</sup> and R<sup>3</sup>    are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid  
phase,  
25     R<sup>4</sup>        is Ar, cycloalkyl, phenylalkyl or Het,  
Y                may be absent and, if present, is alkenyl having 2 to 4 carbon  
atoms,  
Z                may be absent and, if present, is phenylene,  
A                is unbranched or branched alkyl having 1 to 6 carbon atoms,

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,  
 5 Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA,  
 10 - phenyl which is unsubstituted or mono-, di- or trisubstituted by by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>,  
 15 NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>  
 Hal is F, Cl, Br or I,  
 n is 1, 2 or 3,  
 m is 0, 1, 2 or 3,  
 with the proviso if Z and Y are absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl,  
 20 then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,  
 if Z and Y are absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl and R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,  
 if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are ethyl,  
 25 then R or R<sup>1</sup> is not NH<sub>2</sub>,  
 if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl, alkoxyphenyl or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A,  
 and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl  
 and their pharmaceutically tolerable salts and solvates, characterized in  
 30 that

- 8 -

- a) a compound of the formula I is liberated from one of its functional derivatives by treating with a solvolysing or hydrogenolysing agent,  
or  
b) in stage 1) a compound of the formula II

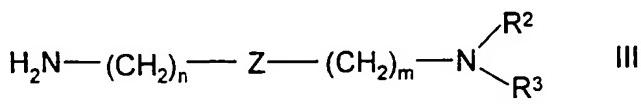
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in which

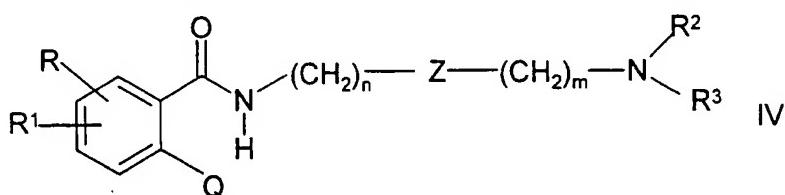
- 10 X is Cl, Br, OH or a reactive esterified OH group  
Q is NH<sub>2</sub> or NHA, either of which optionally is protected, and R and R<sup>1</sup> are  
optionally protected when they are or contain NH<sub>2</sub> or NHA,  
is reacted with a compound of the formula III

15



in which R<sup>2</sup>, R<sup>3</sup>, Z, n and m have the meanings indicated in Claim 1,  
to give a compound of formula IV

20



in which R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, Q, Z, n and m have the meanings indicated above  
and

- 25 in stage 2) a compound of formula IV as indicated above is if necessary  
deprotected to give a compound of formula IV in which Q is NH<sub>2</sub> or NHA  
and is reacted with a compound of formula V



in which R<sup>4</sup> and Y have the meanings indicated in Claim 1,  
or

30

c) a radical R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and/or R<sup>4</sup> is converted into another radical R, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and/or R<sup>4</sup> by, for example

- converting an amino group into a guanidino group by reaction with an amidinating agent,
  - 5 - reducing a nitro group, sulfonyl group or sulfoxyl group,
  - etherifying an OH group or subjecting an OA group to ether cleavage,
  - alkylating a primary or secondary amino group,
  - partially or completely hydrolysing a CN group,
  - 10 - cleaving an ester group or esterifying a carboxylic acid radical,
  - reacting an aryl bromide, aryl iodide, heteroaryl bromide or heteroaryliodide to give the corresponding coupling products by means of a Suzuki coupling with boronic acids,
  - or carrying out a nucleophilic or electrophilic substitution,
- 15 and/or  
a base or acid of the formula I is converted into one of its salts or solvates.

The compounds of the formula I can have a chiral centre and therefore occur in a number of stereoisomeric forms. All these forms (e.g. R and S forms) and their mixtures (e.g. the RS forms) are included in the formula I.

20 The compounds according to the invention also include so-called prodrug derivatives, i.e. compounds of the formula I modified with, for example, alkyl or acyl groups, sugars or oligopeptides and which are rapidly cleaved in the body to give the active compounds according to the invention.

Furthermore, free amino groups as substituents of compounds of the formula I can be provided with appropriate conventional protective groups. Solvates of the compounds of the formula I are understood as meaning adducts of inert solvent molecules to the compounds of the formula I which

are formed on account of their mutual power of attraction. Solvates are, for example, mono- or dihydrates or alcoholates.

The proviso excludes e.g. the following compounds:

- 5        3-(2-amino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-amino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-amino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-amino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-methylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 10        3-(2-methylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-methylamino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-methylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-ethylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-ethylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 15        3-(2-ethylamino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-ethylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-dimethylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-dimethylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-dimethylamino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 20        3-(2-dimethylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-diethylamino-ethyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-diethylamino-ethyl)-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-diethylamino-propyl)-2-phenyl-3H-quinazolin-4-one;
- 3-(2-diethylamino-propyl)-2-p-tolyl-3H-quinazolin-4-one;
- 25        3-(2-methylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;
- 3-(2-methylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-methylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;
- 3-(2-methylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;
- 3-(2-ethylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;
- 30        3-(2-ethylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;

- 3-(2-ethylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-ethylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;
- 5      3-(2-dimethylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-diethylamino-ethyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-diethylamino-ethyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-diethylamino-propyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;
- 10     3-(2-diethylamino-propyl)-6-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-methylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-methylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-methylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-methylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;
- 15     3-(2-ethylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-ethylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-ethylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-ethylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;
- 20     3-(2-dimethylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-diethylamino-ethyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-diethylamino-ethyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;
- 25     3-(2-diethylamino-propyl)-8-chloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-diethylamino-propyl)-8-chloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-methylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-methylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-methylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;
- 30     3-(2-methylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;

- 3-(2-ethylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-ethylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-ethylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-ethylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;
- 5      3-(2-dimethylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-dimethylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-diethylamino-ethyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;
- 10     3-(2-diethylamino-ethyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one;  
3-(2-diethylamino-propyl)-6,8-dichloro-2-phenyl-3H-quinazolin-4-one;  
3-(2-diethylamino-propyl)-6,8-dichloro-2-p-tolyl-3H-quinazolin-4-one and  
6-amino-3-(2-diethylamino-ethyl)-2-styryl-3H-quinazolin-4-one.
- 15     The abbreviations used have the following meanings:  
BOC    tert-butoxycarbonyl,  
CBZ    benzyloxycarbonyl,  
DBU    1,8-diazabicyclo[5.4.0]undec-7-ene,  
DCC    dicyclohexylcarbodiimide,
- 20     DCE    dichloroethane,  
DDQ    2,3-dichloro-5,6-dicyano-1,4-benzoquinone,  
DMA    dimethylacetamide,  
DMF    dimethylformamide,  
dppf    1,1'-bis(diphenylphosphino)ferrocene,
- 25     Et    ethyl,  
Fmoc    fluorenylmethoxycarbonyl,  
HBTU    O-(benzotriazolyl)-N,N,N',N'-tetramethyluronium hexafluoro  
          phosphate,
- Me    methyl,
- 30     Mtr    4-methoxy-2,3,6-trimethylphenylsulfonyl,

	OBut	tert-butyl ester,
	OMe	methyl ester,
	OEt	ethyl ester,
	POA	phenoxyacetyl,
5	Ph	phenyl,
	TEA	triethylamine,
	TFA	trifluoroacetic acid.

In the above formulae, A is alkyl and has 1 to 6, preferably 1, 2, 3 or 4 C atoms. Alkyl is preferably methyl, furthermore ethyl, propyl, isopropyl, butyl, isobutyl, sec-butyl or tert-butyl, additionally also pentyl, 1-, 2- or 3-methylbutyl, 1,1-, 1,2- or 2,2-dimethylpropyl, 1-ethylpropyl, hexyl, 1-, 2-, 3- or 4-methylpentyl, 1,1-, 1,2-, 1,3-, 2,2-, 2,3- or 3,3-dimethylbutyl, 1- or 2-ethylbutyl, 1-ethyl-1-methylpropyl, 1-ethyl-2-methylpropyl, 1,1,2- or 1,2,2-trimethylpropyl.

A is preferentially methyl.

Alkenyl having 2 to 4 carbon atoms is preferably vinyl or buta-1,3-dienyl, vinyl is particularly preferred.

20 Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>.

25 Ar is preferentially phenyl, preferably - as indicated - mono- di- or trisubstituted phenyl, specifically preferentially phenyl, 2-, 3- or 4-methylphenyl, 2-, 3- or 4-ethylphenyl, 2-, 3- or 4-propylphenyl, 2-, 3- or 4-isopropylphenyl, 2-, 3- or 4-tert-butylphenyl, 2-, 3- or 4-aminophenyl, 2-, 3- or 4-N,N-dimethylaminophenyl, 2-, 3- or 4-sulfonamidophenyl, 2-, 3- or 30 4-nitrophenyl, 2-, 3- or 4-hydroxyphenyl, 2-, 3- or 4-methoxyphenyl, 2-, 3-

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or 4-ethoxyphenyl, 2-, 3- or 4-trifluoromethylphenyl, 2-, 3- or 4-trifluoromethoxyphenyl, 2-, 3- or 4-carboxyphenyl, 2-, 3- or 4-cyanophenyl, 2-, 3- or 4-fluorophenyl, 2-, 3- or 4-chlorophenyl, 2-, 3- or 4-bromophenyl.

Furthermore Ar is preferentially unsubstituted naphthyl, biphenyl or  
5 benzofuran-5-yl.

Phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl is particularly preferred for Ar.

15 Cycloalkyl preferably has 3-7 C atoms and is preferably cyclopropyl or cyclobutyl, furthermore preferably cyclopentyl or cyclohexyl, and further also cycloheptyl; cyclohexyl is particularly preferred.

Hal is preferably F, Cl or Br.

20 Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>.

Het is preferably substituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or

5 SO<sub>2</sub>NA<sub>2</sub> or unsubstituted 2- or 3-furyl, 2- or 3-thiophenyl, 1-, 2- or 3-pyrrolyl, 1-, 2-, 4- or 5-imidazolyl, 1-, 3-, 4- or 5-pyrazolyl, 2-, 4- or 5-oxazolyl, 3-, 4- or 5-isoxazolyl, 2-, 4- or 5-thiazolyl, 3-, 4- or 5-isothiazolyl, 2-, 3- or 4-pyridyl, 2-, 4-, 5- or 6-pyrimidinyl, furthermore preferably 1,2,3-triazol-1-, -4- or -5-yl, 1,2,4-triazol-1-, -4- or -5-yl,

10 - 1- or 5-tetrazolyl, 1,2,3-oxadiazol-4- or -5-yl, 1,2,4-oxadiazol-3- or -5-yl, 1,3,4-thiadiazol-2- or -5-yl, 1,2,4-thiadiazol-3- or -5-yl, 1,2,3-thiadiazol-4- or -5-yl, 2-, 3-, 4-, 5- or 6-2H-thiopyranyl, 2-, 3- or 4-4H-thiopyranyl, 3- or 4-pyridazinyl, pyrazinyl, 2-, 3-, 4-, 5-, 6- or 7-benzofuryl, 2-, 3-, 4-, 5-, 6- or 7-benzothienyl, 1-, 2-, 3-, 4-, 5-, 6- or 7-1H-indolyl, 1-, 2-, 4- or 5-benzimidazolyl, 1-, 3-, 4-, 5-, 6- or 7-benzopyrazolyl, 2-, 4-, 5-, 6- or 7-benzoxazolyl, 3-, 4-, 5-, 6- or 7-benzisoxazolyl, 2-, 4-, 5-, 6- or 7-benzothiazolyl, 2-, 4-, 5-, 6- or 7-benzisothiazolyl, 4-, 5-, 6- or 7-benz-2,1,3-oxadiazolyl, 1-, 2-, 3-, 4-, 5-, 6-, 7- or 8-quinolinyl, 1-, 3-, 4-, 5-, 6-, 7- or 8-isoquinolinyl, 1-, 2-, 3-, 4- or 9-carbazolyl, 1-, 2-, 3-, 4-, 5-, 6-, 7-, 8- or 9-acridinyl, 3-, 4-, 5-, 6-, 7- or 8-cinnolinyl, 2-, 4-, 5-, 6-, 7- or 8-quinazolinyl. The heterocyclic radicals can also be partially or completely hydrogenated. Het can thus also be 2,3-dihydro-2-, -3-, -4- or -5-furyl, 2,5-dihydro-2-, -3-, -4- or -5-furyl, tetrahydro-2- or -3-furyl, 1,3-dioxolan-4-yl, 25 tetrahydro-2- or -3-thienyl, 2,3-dihydro-1-, -2-, -3-, -4- or -5-pyrrolyl, 1-, 2- or 3-pyrrolidinyl, tetrahydro-1-, -2- or -3-pyrrolyl, tetrahydro-1-, -2- or 4-imidazolyl, 2,3-dihydro-1-, -2-, -3-, -4-, -5-, -6-, -7-1H-indolyl, 2,3-dihydro-1-, -2-, -3-, -4- or -5-pyrazolyl, tetrahydro-1-, -3- or 30 -4-pyrazolyl, 1,4-dihydro-1-, -2-, -3- or -4-pyridyl,

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- 1,2,3,4-tetrahydro-1-, -2-, -3-, -4-, -5- or -6-pyridyl,  
1,2,3,6-tetrahydro-1-, -2-, -3-, -4-, -5- or -6-pyridyl, 1-, 2-, 3- or  
4-piperidinyl, 1-, 2-, 3- or 4-azepanyl, 2-, 3- or 4-morpholinyl,  
tetrahydro-2-, -3- or -4-pyranyl, 1,4-dioxanyl, 1,3-dioxan-2-, -4- or  
5 -5-yl, hexahydro-1-, -3- or -4-pyridazinyl, hexahydro-1-, -2-, -4- or  
-5-pyrimidinyl, 1-, 2- or 3-piperazinyl, 1,2,3,4-tetrahydro-1-, -2-, -3-,  
-4-, -5-, -6-, -7- or -8-quinolinyl, 1,2,3,4-tetrahydro-1-, -2-, -3-,  
-4-, -5-, -6-, -7- or -8-isoquinolinyl.
- 10 - 2-Furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl  
or 5-[2,2']bithiophenyl is particularly preferred for Het.
- 15 Phenylalkyl preferably has 7, 8, 9 or 10 carbon atoms and is preferably  
phenylmethyl, phenylethyl, phenylpropyl or phenylbutyl; phenylethyl is  
particularly preferred.
- The term solid phase indicates a resin for solid-phase chemistry, especially  
for combinatorial chemistry, i.e. by robot- and computer-assisted  
syntheses, and subjected to mass screening as indicated in US 5,463,564;  
20 M. A. Gallop et al., J. Med. Chem. 1994, 37, 1233-1251 and 1385-1401  
and M.J. Sofia, Drugs Discovery Today 1996, 1, 27-34). The polymeric  
material of the solid phase is generally chosen from the group consisting of  
cross-linked polystyrene, cross-linked polyacrylamide or other resins,  
natural polymers or silicagels.
- 25 The group of cross-linked polystyrene, cross-linked polyacrylamide or other  
resins includes e.g. polyacrylamide, polymethacrylamide,  
polyhydroxyethylmethacrylate, polyamide, polystyrene, (meth)acrylate  
copolymers, for instance from (meth)acrylic acid, esters of (meth)acrylic

acid and/or 2-methylene-succinic acid, but-2-enoic acid or maleic acid, polyurethanes or other copolymers.

- Suitable terminal functional groups or linkers on the surface of the resin  
5 have to be chosen to attach the compounds to the resin. There exists a variety of commercially available resins, e.g. in Novabiochem - The Combinatorial Chemistry Catalog, March 99. Examples for suitable resins are carbonate resins with a modified carbonate group as terminal functional group like p-nitrophenylcarbonate resin, halogenated resins like Merrifield  
10 resin (chloromethylpolystyrene) or carboxy resins-like carboxy polystyrene resin or NovaSyn® TG Carboxy Resin. p-Nitrophenylcarbonate resin is particularly preferred. These and other types of resins well known in the art can be used in the subject invention.
- 15 R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A, where A, Ar, Hal have a preferred meaning indicated beforehand and R<sup>2</sup> have a preferred meaning indicated in the following.
- 20 R is preferentially H.  
R<sup>1</sup> is preferentially H, A, OA or Hal.  
The preferred position of R<sup>1</sup> is the 6- or 7-position of the quinazolinone ring system.
- 25 R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or a solid phase, where A or solid phase have a preferred meaning indicated beforehand.
- R<sup>2</sup> is preferentially H.  
30 R<sup>3</sup> is preferentially H or -C(=NH)-NH<sub>2</sub>, particularly preferred is H.

R<sup>4</sup> is Ar, phenylalkyl, cycloalkyl or Het, where Ar, phenylalkyl, cycloalkyl or Het have a preferred meaning indicated beforehand. R<sup>4</sup> is preferentially phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-  
5 butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl, phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl.  
10

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms. Y is preferentially absent or vinyl.

15 Z may be absent and, if present, is phenylene.

n is 1, 2 or 3, particularly preferred 1.

m is 0, 1, 2 or 3, particularly preferred 1.

20 Some preferred groups of compounds can be expressed by the following subformulae Ia to Iv, which correspond to the formula I and in which the radicals not designated in greater detail have the meanings indicated in formula I, but in which

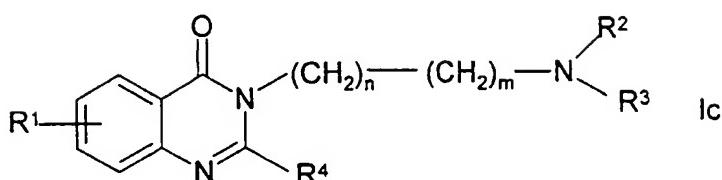
25 in Ia R is H and  
R<sup>1</sup> is H, A, OA or Hal;

in Ib R is H,  
R<sup>1</sup> is H, A, OA or Hal and

30 Y is absent;

in Ic      R      is H,  
               R<sup>1</sup>    is H, A, OA or Hal,  
               Y      is absent and

5            Z      is absent;

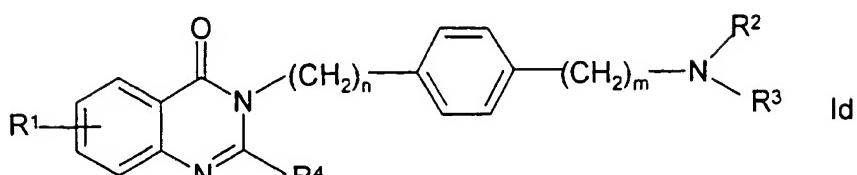


10           in Id    R      is H,  
               R<sup>1</sup>    is H, A, OA or Hal,  
               R<sup>4</sup>    is Ar, cycloalkyl or Het,  
               Y      is absent and  
               Z      is absent;

15           in Ie    R      is H,  
               R<sup>1</sup>    is H, A, OA or Hal,  
               R<sup>4</sup>    is Het,  
               Y      is absent and  
               Z      is absent;

20           in If    R      is H,  
               R<sup>1</sup>    is H, A, OA or Hal,  
               Y      is absent and  
               Z      is phenylene;

30



- 20 -

- in Ig      R      is H,  
R<sup>1</sup>    is H, A, OA or Hal and  
Y      is alkenyl having 2 to 4 carbon atoms;
- 5        in Ih      R      is H,  
R<sup>1</sup>    is H, A, OA or Hal,  
Y      is alkenyl having 2 to 4 carbon atoms and  
Z      is absent;
- 10      in II      R      is H,  
R<sup>1</sup>    is H, A, OA or Hal,  
Y      is alkenyl having 2 to 4 carbon atoms and  
Z      is phenylene;
- 15      in Ij      R      is H,  
R<sup>1</sup>    is H, A, OA or Hal,  
R<sup>2</sup>    is H and  
R<sup>4</sup>    is Ar;
- 20      in Ik      R      is H,  
R<sup>1</sup>    is H, A, OA or Hal,  
R<sup>2</sup>    is H and  
R<sup>4</sup>    is phenylalkyl;
- 25      in Im      R      is H,  
R<sup>1</sup>    is H, A, OA or Hal,  
R<sup>2</sup>    is H and  
R<sup>4</sup>    is cycloalkyl;
- 30      in In      R      is H,

R<sup>1</sup> is H, A, OA or Hal,

R<sup>2</sup> is H and

R<sup>4</sup> is Het;

5       in lo   R   is H,

R<sup>1</sup> is H, A, OA or Hal,

R<sup>2</sup> is H,

R<sup>3</sup> is H,

10              R<sup>4</sup> is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl,

15              phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,

Z    is absent,

n    is 1 and

m    is 1;

20

in lp   R   is H,

R<sup>1</sup> is H, A, OA or Hal,

R<sup>2</sup> is H,

R<sup>3</sup> is H,

25              R<sup>4</sup> is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-dimethylaminophenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 2,5-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl,

30

phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl,  
5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,

5 Z is phenylene,

n is 1 and

5 m is 1;

in Iq R is H,

R<sup>1</sup> is H, A, OA or Hal,

R<sup>2</sup> is H,

10 R<sup>3</sup> is H,

Y is -CH=CH-,

R<sup>4</sup> is phenyl, 4-dimethylaminophenyl or 2,5-dimethoxyphenyl,

Z is absent,

n is 1 and

15 m is 1;

in Ir R is H,

R<sup>1</sup> is H, A, OA or Hal,

R<sup>2</sup> is H,

20 R<sup>3</sup> is H,

Y is -CH=CH-,

R<sup>4</sup> is phenyl, 4-dimethylaminophenyl or 2,5-dimethoxyphenyl,

Z is phenylene,

n is 1 and

25 m is 1;

in Is R is H,

R<sup>1</sup> is H, A, OA or Hal,

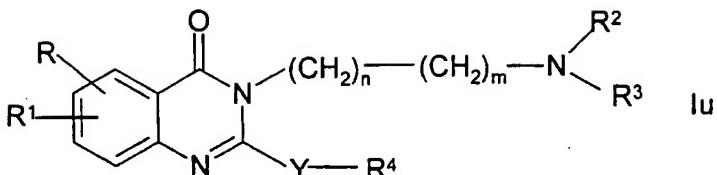
R<sup>2</sup> is H,

30 R<sup>3</sup> is H,

- 23 -

- Y is absent,
- R<sup>4</sup> is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 5  
3',5'-dimethoxybiphenyl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl, phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,
- Z is absent,
- n is 1 and
- m is 1;
- in It R is H,  
R<sup>1</sup> is H, OA or Hal,  
R<sup>2</sup> is H,  
R<sup>3</sup> is H,  
Y is absent,
- R<sup>4</sup> is phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-methoxyphenyl, 3-methoxyphenyl, 3-chlorophenyl, 3,4,5-trimethoxyphenyl, 3,4-dimethoxyphenyl, 3',5'-dimethoxybiphenyl-4-yl, 2',4'-dimethoxybiphenyl-4-yl, biphenyl-4-yl, naphthalen-1-yl, naphthalen-2-yl or benzofuran-5-yl, phenylethyl, cyclohexyl, 2-furyl, thiophen-2-yl, thiophen-3-yl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl,
- Z is phenylene,
- n is 1 and
- m is 1;

in Iu



5

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

10 R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid phase,

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

15 Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or

20 bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

25 30 Hal is F, Cl, Br or I,

- 25 -

n is 1, 2 or 3,

m is 0, 1, 2 or 3,

with the proviso if Y is absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H,

5 methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,

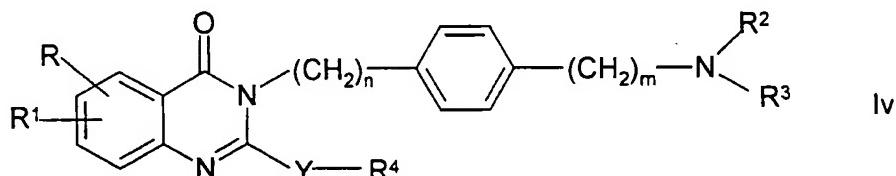
if Y is absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl, R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H,

then the sum of n and m (= n+m) is not 2 or 3,

if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are ethyl,  
then R or R<sup>1</sup> is not NH<sub>2</sub>,

10 if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl, alkoxyphenyl  
or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A,  
and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl  
and their pharmaceutically tolerable salts and solvates;

15 in Iv



20 R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal,  
NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>,  
COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid  
phase,

25 R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon  
atoms,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is

30 unsubstituted or mono-, di- or trisubstituted by A, OH, OA,

- 26 -

CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>,  
SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

- Het is a saturated, partially or completely unsaturated mono- or  
bicyclic heterocyclic radical having 5 to 10 ring members,  
where 1 or 2 N and/or 1 or 2 S or O atoms can be present and  
the heterocyclic radical can be mono- or disubstituted by A,  
Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA,  
phenyl which is unsubstituted or mono-, di- or trisubstituted by  
by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>,  
NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl  
which is unsubstituted or mono-, di- or trisubstituted by A, OH,  
OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>,  
NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>
- Hal is F, Cl, Br or I,  
n is 1, 2 or 3,  
m is 0, 1, 2 or 3,  
and their pharmaceutically tolerable salts and solvates.

- The compounds of the formula I and also the starting substances for their preparation are otherwise prepared by methods known per se, such as are described in the literature (e.g. in the standard works such as Houben-Weyl, Methoden der organischen Chemie [Methods of Organic Chemistry], Georg-Thieme-Verlag, Stuttgart), namely under reaction conditions which are known and suitable for the reactions mentioned. In this case, use can also be made of variants which are known per se, but not mentioned here in greater detail.

The starting substances, if desired, can also be formed in situ such that they are not isolated from the reaction mixture, but immediately reacted further to give the compounds of the formula I.

- 5      The compounds of the formula I can be obtained by liberating them from their functional derivatives by solvolysis, in particular hydrolysis or by hydrogenolysis.

- Preferred starting substances for the solvolysis or hydrogenolysis are those  
10     which otherwise correspond to the formula I, but instead of one or more free amino and/or hydroxyl groups contain corresponding protected amino and/or hydroxyl groups, in particular those which instead of an H-N- group carry an R'-N- group, in which R' is an amino protective group and/or those which instead of the H atom of a hydroxyl group carry a hydroxyl protective group,  
15     e.g. those which correspond to the formula I, but instead of a group -COOH carry a group -COOR", in which R" is a hydroxyl protective group.

- A number of - identical or different - protected amino and/or hydroxyl groups can also be present in the molecule of the starting substance. If the  
20     protective groups present are different from one another, in many cases they can be removed selectively (lit.: T.W. Greene, P.G.M. Wuts, *Protective Groups in Organic Chemistry*, 2nd ed., Wiley, New York 1991 or P.J. Kocienski, *Protecting Groups*, 1st ed., Georg Thieme Verlag, Stuttgart - New-York, 1994).

- 25     The expression "amino protective group" is generally known and relates to groups which are suitable for protecting (for blocking) an amino group against chemical reactions, but which are easily removable after the desired chemical reaction has been carried out at other positions in the  
30     molecule. Typical groups of this type are, in particular, unsubstituted or

substituted acyl, aryl, aralkoxymethyl or aralkyl groups. Since the amino protective groups are removed after the desired reaction (or reaction sequence), their nature and size is otherwise not critical; however, those having 1-20, in particular 1-8, C atoms are preferred. The expression "acyl group" is to be interpreted in the widest sense in connection with the present process. It includes acyl groups derived from aliphatic, araliphatic, aromatic or heterocyclic carboxylic acids or sulfonic acids and, in particular, alkoxy carbonyl groups, aryloxycarbonyl groups and especially aralkoxycarbonyl groups. Examples of acyl groups of this type are alkanoyl such as acetyl, propionyl, butyryl; aralkanoyl such as phenylacetyl; aroyl such as benzoyl or toluyl; aryloxy alkanoyl such as POA; alkoxy carbonyl such as methoxycarbonyl, ethoxycarbonyl, 2,2,2-trichloroethoxycarbonyl, BOC, 2-iodoethoxycarbonyl; aralkyloxycarbonyl such as CBZ ("carbobenzoxy"), 4-methoxybenzyloxycarbonyl (MOZ), 4-Nitrobenzyloxycarbonyl oder 9-fluorenylmethoxycarbonyl (Fmoc); 2-(phenylsulfonyl)ethoxycarbonyl; trimethylsilylethoxycarbonyl (Teoc) or arylsulfonyl such as 4-methoxy-2,3,6-trimethylphenyl-sulfonyl (Mtr). Preferred amino protective groups are BOC, furthermore CBZ, Fmoc, benzyl and acetyl; particularly preferred Fmoc.

The expression "hydroxyl protective group" is also generally known and relates to groups which are suitable for protecting a hydroxyl group against chemical reactions, but which are easily removable after the desired chemical reaction has been carried out at other positions in the molecule.

Typical groups of this type are the abovementioned unsubstituted or substituted aryl, aralkyl, aroyl or acyl groups, furthermore also alkylgroups, alkyl-, aryl- or aralkylsilylgroups or O,O- or O,S-acetals. The nature and size of the hydroxyl protective groups is not critical, since they are removed again after the desired chemical reaction or reaction sequence; groups

- having 1-20, in particular 1-10 C atoms, are preferred. Examples of hydroxyl protective groups are, inter alia, benzyl, 4-methoxybenzyl oder 2,4-dimethoxybenzyl, aroyl groups such as benzoyl or p-nitrobenzoyl, acyl groups such as acetyl or pivaloyl, p-toluolsulfonyl, alkyl groups such as 5 methyl or tert-butyl, but also allyl, alkylsilyl groups such as trimethylsilyl (TMS), triisopropylsilyl (TIPS), tert-butyldimethylsilyl (TBS) or triethylsilyl, trimethylsilylethyl, aralkylsilyl groups such as tert-butyldiphenylsilyl (TBDPS), cyclic acetals such as isopropylidene-, cyclopentylidene-, cyclohexylidene-, benzylidene-, p-methoxybenzylidene- or o,p-dimethoxybenzylideneacetal, acyclic acetals such as tetrahydropyranyl (Thp), methoxymethyl (MOM), methoxyethoxymethyl (MEM), benzyloxymethyl (BOM) or methylthiomethyl (MTM). Acetyl, benzyl, tert-butyl or TBS being particularly preferred.
- 15 The liberation of the compounds of the formula I from their functional derivatives depending on the protective group used is known in the present literature such as T.W. Greene, P.G.M. Wuts, *Protective Groups in Organic Chemistry*, 2nd ed., Wiley, New York 1991, P.J. Kocienski, *Protecting Groups*, 1st ed., Georg Thieme Verlag, Stuttgart - New-York, 1994. In this 20 case, use can also be made of variants which are known per se, but not mentioned here in greater detail.
- The groups BOC and O-tert-butyl can preferably be removed, for example, using TFA in dichloromethane or using approximately 3 to 5N HCl in 25 dioxane at 15-30°C, the Fmoc group using an approximately 5 to 50% solution of dimethylamine, diethylamine or piperidine in DMF at 15-30°C.
- Preferred starting substances for the solvolysis or hydrogenolysis includes also those which otherwise correspond to the formula I, but are attached to 30 a solid phase. The liberation of the compounds of the formula I from the

solid phase is known in the present literature such as Novabiochem - The Combinatorial Chemistry Catalog, March 99 and cited literature.

5 The solid phase with a carbonate moiety as terminal functional group can preferably be removed, for example, using TFA (50%) in dichloromethane.

The quinazolinones of formula I can also preferably be prepared, using either solution or solid-phase techniques, by combining and reacting an anthranilic acid of formula II with an amine of formula III and if necessary 10 deprotect the given formula IV in which Q is then NH<sub>2</sub> or NHA and reacting the compound of formula IV in which Q is NH<sub>2</sub> or NHA with an aldehyde of formula V.

As a rule, the starting compounds of the formulae II, III and V are known or 15 commercially available.

The unknown compounds, however, can be prepared by methods known per se. The compounds of the formula II are anthranilic acids. It is furthermore possible to introduce appropriate substituents into the aromatic by conventional electrophilic or alternatively nucleophilic substitutions.

20 Examples of Fmoc protected anthranilic acids, include, but are not limited to, Fmoc protected anthranilic acid; Fmoc protected 3-methyl anthranilic acid, Fmoc protected 3-methoxy anthranilic acid, Fmoc protected 3-chloro anthranilic acid or Fmoc protected 4-chloro anthranilic acid.

25 Solid-phase techniques may be employed to condense anthranilic acids of formula II and the amine component of formula III which is resin bound (R<sup>2</sup> or R<sup>3</sup> is solid phase).

The amines of formula III in which R<sup>2</sup> or R<sup>3</sup> are H, as a rule, are also commercially available and can be attached to the suitable resin by 30 coupling procedures well known in the art and as described in the ensuing

Examples. Furthermore, syntheses for the preparation of amines of formula III, such as, for example, the Gabriel synthesis, can be used.

The aldehydes of formula V, as a rule, are also commercially available.

- 5      Furthermore, syntheses for the preparation of aldehydes of formula V, such as, for example, the oxidation of an alcohol, can be used.

As a rule, the reactions and the attachment to the resin are carried out in an inert solvent. Depending on the conditions used, the reaction time is  
10     between a few minutes and a number of days, the reaction temperature between approximately 0° and 150°C, normally between 20° and 130°C.  
Suitable inert solvents are, for example, hydrocarbons such as hexane, petroleum ether, benzene, toluene or xylene; chlorinated hydrocarbons such as trichloroethylene, 1,2-dichloroethane, carbon tetrachloride,  
15     chloroform or dichloromethane; alcohols such as methanol, ethanol, isopropanol, n-propanol, n-butanol or tert-butanol; ethers such as diethyl ether, diisopropyl ether, tetrahydrofuran (THF) or dioxane; glycol ethers such as ethylene glycol monomethyl or monoethyl ether (methyl glycol or ethyl glycol), ethylene glycol dimethyl ether (diglyme); ketones such as acetone or butanone; amides such as acetamide, N-methylpyrrolidone (NMP), dimethylacetamide or dimethylformamide (DMF); nitriles such as acetonitrile; sulfoxides such as dimethyl sulfoxide (DMSO); carbon disulfide; carboxylic acids such as formic acid or acetic acid; nitro compounds such as nitromethane or nitrobenzene; esters such as ethyl acetate or mixtures of the solvents mentioned.

30     The reaction of the compounds of formula II with compounds of formula III is analogously to the coupling of peptides. The condensation reaction of formula II with formula III is preferably carried out in an inert solvent as indicated above in the presence of a dehydrating agent, such as,

dicyclohexylcarbodiimide (DCC), N-(3-dimethylaminopropyl)-N'-ethyl-carbodiimide-hydrochlorid (EDC) or diisopropylcarbodiimide (DIC), further for instance in the presence af an anhydride of propanphosphonic acid (see Angew. Chem. 1980, 92, 129), diphenylphosphorylazide or 2-ethoxy-N-ethoxycarbonyl-1,2-dihydroquinoline.

Particularly preferred is the presence of a coupling agent, such as TBTU (O-(benzotriazol-1-yl)-N,N,N',N'-bis-(tetramethylene)-uronium tetrafluoroborate) or O-(benzotriazol-1-yl)-N,N,N',N'-bis-(tetramethylene)-10 uronium hexafluorophosphate.

A compound of formula II in which X is a reactive esterified OH group can be synthesized by reacting a compound of formula II in which X is OH with HOBr (1-hydroxybenzotriazole) or N-hydroxysuccinimide(e.g. in the standard works such as Houben-Weyl, Methoden der organischen Chemie [Methods of Organic Chemistry], Georg-Thieme-Verlag, Stuttgart).

For the preparation of compounds of the formula I in which R<sup>2</sup> or R<sup>3</sup> are -C(=NH)-NH-, a compond of formula I in which R<sup>2</sup> and R<sup>3</sup> are H can be treated with an amidinating agent. The preferred amidinating agent is 1-amidino-3,5-dimethylpyrazole (DPFN), which is employed, in particular, in the form of its nitrate, or pyrazole-1-carboxamidine. The reaction is expediently carried out with addition of a base such as triethylamine or ethyldiisopropylamine in an inert solvent or solvent mixture, e.g. DMF at temperatures between 0° and 150°C, preferably between 60° and 120°C.

For the preparation of compounds of the formula I in which R<sup>4</sup> is unsubstituted or substituted biphenyl, 5-(3,4-dimethoxyphenyl)-thiophen-2-yl or 5-[2,2']bithiophenyl, an appropriate compound of the formula I in which R<sup>4</sup> is phenyl chloride, phenyl bromide, phenyl iodide, thiophenyl chloride,

thiophenyl bromide or thiophenyl iodide can be reacted with the appropriate boronic acid derivatives in a Suzuki type coupling reaction. This reaction is expediently carried out under Palladium catalysis with different Phosphines as coordination ligands, e.g.  $\text{Pd}(\text{P}(\text{Ph})_3)_2$ ,  $\text{Pd}(\text{II})\text{Cl}_2\text{dppf}$ ,  $\text{PdOAc}_2 + \text{P}(\text{R}^*)_3$

5      ( $\text{R}^*$  = phenyl, cyclohexyl, tert-butyl) etc. in the presence of a base such as potassium carbonate, caesium carbonate, DBU, NaOH, in an inert solvent or solvent mixture, e.g. DMF or 1,4-dioxane at temperatures between 0° and 150°, preferably between 60° and 120°. Depending on the conditions used, the reaction time is between a few minutes and a number of days.

10     The boronic acid derivatives can be prepared by conventional methods or are commercially available. The reactions can be carried out in analogy to the methods indicated in Suzuki et al., J. Am. Chem. Soc. 1989, 111, 314ff., Suzuki et al., Chem. Rev. 1995, 95, 2457ff and G.C. Fu et al. Angew. Chem 1998, 110, 3586.

15     A base of the formula I can be converted into the associated acid addition salt using an acid, for example by reaction of equivalent amounts of the base and of the acid in an inert solvent such as ethanol and subsequent evaporation. Acids which give physiologically acceptable salts are

20     particularly suitable for this reaction. Thus inorganic acids can be used, e.g. sulfuric acid, nitric acid, hydrohalic acids such as hydrochloric acid or hydrobromic acid, phosphoric acids such as orthophosphoric acid, sulfamic acid, furthermore organic acids, in particular aliphatic, alicyclic, araliphatic, aromatic or heterocyclic mono- or polybasic carboxylic, sulfonic or sulfuric

25     acids, e.g. formic acid, acetic acid, propionic acid, pivalic acid, diethylacetic acid, malonic acid, succinic acid, pimelic acid, fumaric acid, maleic acid, lactic acid, tartaric acid, malic acid, citric acid, gluconic acid, ascorbic acid, nicotinic acid, isonicotinic acid, methane- or ethanesulfonic acid, p-toluenesulfonic acid, naphthalenemono- and disulfonic acids or

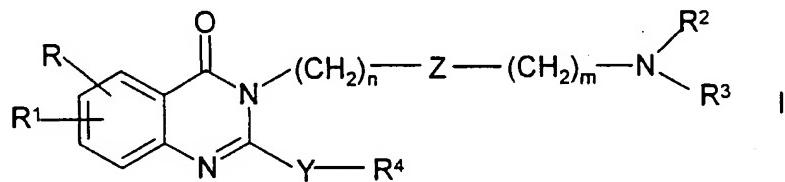
30     laurylsulfuric acid. Salts with physiologically unacceptable acids, e.g.

picrates, can be used for the isolation and/or purification of the compounds of the formula I.

On the other hand, compounds of the formula I with bases (e.g sodium or potassium hydroxide or carbonate) can be converted into the  
5 corresponding metal salts, in particular alkali metal or alkaline earth metal salts, or into the corresponding ammonium salts.

The invention furthermore relates to pharmaceutical preparations comprising at least one compound of the formula I

10



in which

- 15      R and R<sup>1</sup>    are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,  
R<sup>2</sup> and R<sup>3</sup>    are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid phase,
- 20      R<sup>4</sup>        is Ar, cycloalkyl, phenylalkyl or Het,  
Y        may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,  
Z        may be absent and, if present, is phenylene,  
A        is unbranched or branched alkyl having 1 to 6 carbon atoms,  
25      Ar         is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,  
Het      is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members,
- 30

where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A,

Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by

5 by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

10 Hal is F, Cl, Br or I,

n is 1, 2 or 3,

m is 0, 1, 2 or 3,

with the proviso

if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are ethyl,

15 then R or R<sup>1</sup> is not NH<sub>2</sub>,

if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl, alkoxyphenyl or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A,

and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl

20 and/or one of its physiologically acceptable salts, which are prepared, in particular, in a non-chemical way. In this case, the compounds of the formula I according to Claim 4 can be brought into a suitable dose form together with at least one solid, liquid and/or semi-liquid excipient or auxiliary and, if appropriate, in combination with one or more other active compounds.

25

These preparations can be used as medicaments in human or veterinary medicine. Possible excipients are organic or inorganic substances which are suitable for enteral (e.g. oral) or parenteral administration or topical application and do not react with the novel compounds, for example water,

30 vegetable oils, benzyl alcohols, alkylene glycols, polyethylene glycols,

- glyceryl triacetate, gelatin, carbohydrates such as lactose or starch, magnesium stearate, talc and petroleum jelly. Tablets, pills, coated tablets, capsules, powders, granules, syrups, juices or drops are used, in particular, for oral administration, suppositories are used for rectal administration,
- 5       solutions, preferably oily or aqueous solutions, furthermore suspensions, emulsions or implants, are used for parenteral administration, and ointments, creams or powders are used for topical application. The novel compounds can also be lyophilized and the lyophilizates obtained used, for example, for the production of injection preparations. The preparations
- 10      indicated can be sterilized and/or can contain auxiliaries such as lubricants, preservatives, stabilizers and/or wetting agents, emulsifiers, salts for affecting the osmotic pressure, buffer substances, colourants, flavourings and/or one or more other active compounds, e.g. one or more vitamins.
- 15      The compounds of the formula I and their physiologically acceptable salts act as adhesion receptor antagonists, in particular glycoprotein IbIX antagonists, and can be employed for the prophylaxis and/or therapy of thrombotic disorders and sequelae deriving therefrom. The disorders are acute coronary syndromes, angina pectoris, myocardial infarct, peripheral
- 20      circulatory disorders, stroke, transient ischaemic attacks, arteriosclerosis and reocclusion/restenosis after angioplasty/stent implantation.
- In this case, the substances according to the invention are as a rule administered in the dose of the glycoprotein IIbIIIa antagonist ReoPro® of
- 25      preferably between approximately 1 and 500 mg, in particular between 5 and 100 mg, per dose unit. The daily dose is preferably between approximately 0.02 and 10 mg/kg of body weight. The specific dose for each patient depends, however, on all sorts of factors, for example on the efficacy of the specific compound employed, on the age, body weight,
- 30      general state of health and sex, on the diet, on the time and route of

administration, and on the excretion rate, pharmaceutical combination and severity of the particular disorder to which the therapy applies. Oral administration is preferred.

- 5      Above and below, all temperatures are indicated in °C. In the following examples, "customary working-up" for solution reactions means: if necessary, water is added, if necessary, depending on the constitution of the final product, the mixture is adjusted to pHs between 2 and 10 and extracted with ethyl acetate or dichloromethane, the organic phase is  
10     separated off, dried over sodium sulfate and evaporated, and the residue is purified by chromatography on silica gel and/or by crystallization.

- "Customary working-up" for solid-phase reactions means: the crude reaction is filtered and washed with DMF twice, then successively with  
15     methanol and methylene chloride three times, and finally once with methyl tert-butyl ether. The resin is then dried in vacuo.

Mass spectrometry (MS) apparatuses Kratos Maldi III and Finnigan LCQ.  
(M+H)<sup>+</sup> or M<sup>+</sup> values are determined.

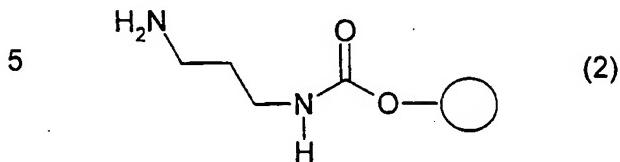
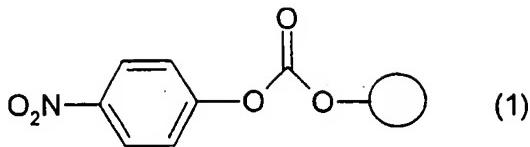
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## EXAMPLES

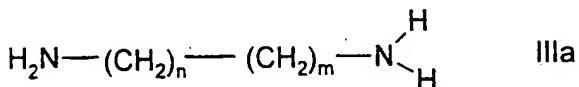
### Example 1:

- 3 grams (1.62 mmol) of p-nitrophenylcarbonate resin (1) [Novabiochem:  
25     0.54 mmol/g loading) is suspended in 30 ml of DMF then 8.1 mmol of propane-1,3-diamine is added at room temperature. The reaction is then heated to 55° and left to stir for two days. The crude reaction is then customary worked up for solid-phase reactions affording the resin bound bis amine (2).

30

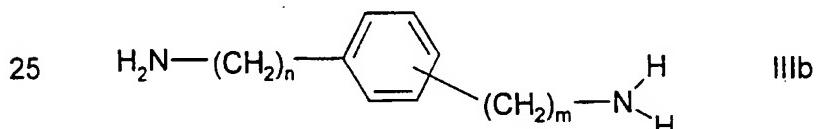


Analogously, by reaction of the p-nitrophenylcarbonate resin (1) with the bis amines of formula IIIa in which Z is absent, R<sup>2</sup> and R<sup>3</sup> are H and n and m has the meanings indicated in Claim 1, excluding propane-1,3-diamine,



- the following resin bound bis amines are obtained:
- 15 methanediamine, resin bound;  
ethane-1,2-diamine, resin bound;  
butane-1,4-diamine, resin bound;  
pentane-1,5-diamine, resin bound and  
hexane-1,6-diamine, resin bound.

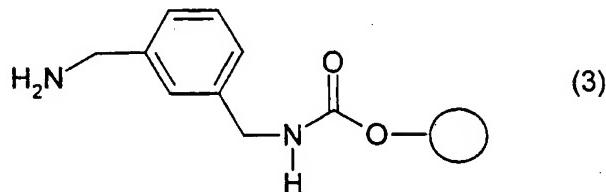
20 Analogously, by reaction of the p-nitrophenylcarbonate resin (1) with the bis amines of formula IIIb in which Z is phenylene, R<sup>2</sup> and R<sup>3</sup> are H and n and m has the meanings indicated in Claim 1,



- the following resin bound bis amines are obtained:
- 30 3-aminomethyl-phenylamine, resin bound;  
3-aminoethyl-phenylamine, resin bound;  
3-aminopropyl-phenylamine, resin bound;

## 3-aminomethyl-benzylamine, resin (3)

5



10

- 3-aminoethyl-benzylamine, resin bound;
- 3-aminopropyl-benzylamine, resin bound;
- 2-[3-(2-aminoethyl)-phenyl]-ethylamine, resin bound;
- 3-[3-(3-aminopropyl)-phenyl]-propylamine, resin bound;
- 4-aminomethyl-phenylamine, resin bound;
- 4-aminoethyl-phenylamine, resin bound;
- 4-aminopropyl-phenylamine, resin bound;
- 4-aminomethyl-benzylamine, resin bound;
- 4-aminoethyl-benzylamine, resin bound;
- 15 4-aminopropyl-benzylamine, resin bound;
- 2-[4-(2-aminoethyl)-phenyl]-ethylamine, resin bound and
- 3-[4-(3-aminopropyl)-phenyl]-propylamine, resin bound.

20

Example 2:

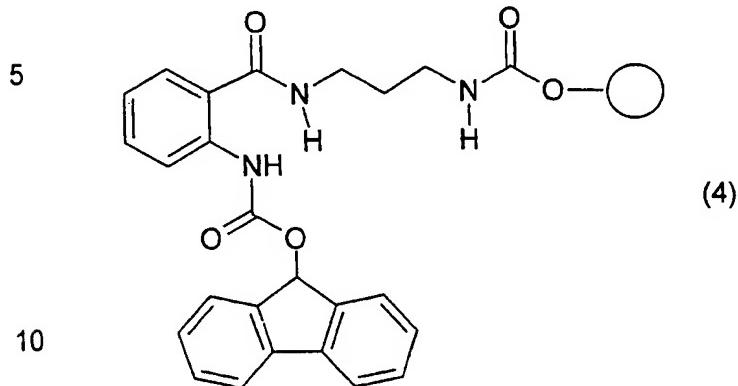
1. *Synthesis of Fmoc protected anthranilic acid*  
29.15 mmol of anthranilic acid is taken in 100 ml of 1,4 dioxane then 145 mmol of sodium bicarbonate in 20 ml of water is added. Next, 32 mmol of Fmoc-Cl is added and the reaction is left to stir overnight at room temperature. The reaction is then concentrated in vacuo and customary worked up for solution reactions. The resulting solid is triturated in ethyl ether affording the pure product.

30

2. *Coupling of Fmoc protected anthranilic acid to resin*

- 1 gram of resin (2) is suspended in 10 ml of DMF. The reaction is then treated with 1.62 mmol of Fmoc protected anthranilic acid, 1.62 mmol of

HBTU, and 1.62 mmol of triethyl amine. The reaction is then allowed to shake overnight at room temperature. After customary working up, the resin is dried in vacuo affording resin bound anthranilic acid (4).

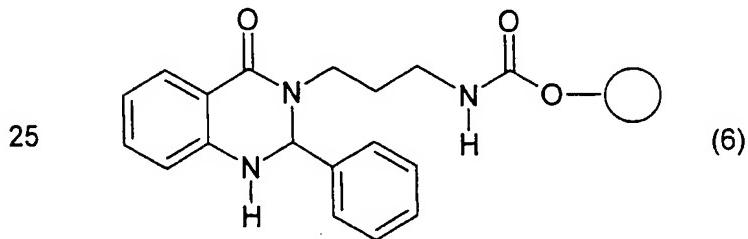


### 3. Cleavage of Fmoc protected group

1 gram resin (4) is suspended in 10 ml of 20% piperidine/DMF and shaken for 1.5 hours at room temperature. The reaction is then customary worked up for solid-phase reactions affording the free aniline (5).

### 4. Aldehyde condensation and ring closure

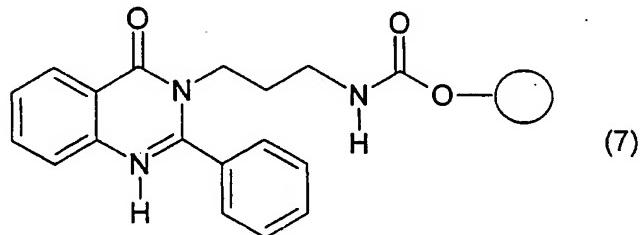
100 mg resin (5) is suspended in 1 ml of dimethyl acetamide then 200 µl of acetic acid is added followed by the addition of 2.16 mmol of benzaldehyde. The reaction is then heated to 80° for two days. The reaction is then cooled to room temperature and customary worked up for solid-phase reactions affording the resin (6).



### 5. Oxidation to quinazolinone

100 mg resin (6) is suspended in 4 ml solution of 36 mg of DDQ in DMF. Then the reaction is allowed to shake overnight at room temperature. The reaction is then customary worked up for solid-phase reactions affording quinazolinone (7) resin bound.

5



10

6. *Cleavage of the final product 3-(3-aminopropyl)-2-phenyl-3H-quinazolin-4-one*

15

100 mg of resin (7) is suspended in 2 ml of a 50% trifluoroacetic acid/methylen chloride solution and shaken for 1.5 hours at room temperature. Customary working up for solid-phase reactions afforded 3-(3-aminopropyl)-2-phenyl-3H-quinazolin-4-one;

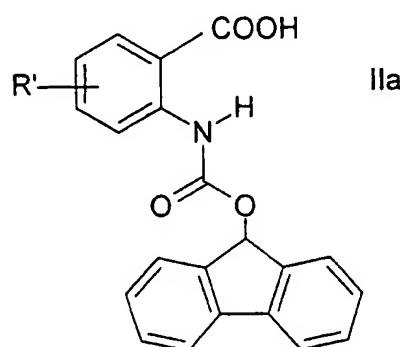
MS      calc.: 279.3 found: 280.1.

20

Example 3:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa

25



30

cleavage of the Fmoc protecting group and reaction with benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

5 with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;

MS calc.: 313.8 found: 314.0;

with R' = 3-CH<sub>3</sub> in formula IIa

10 3-(3-aminopropyl)-6-methyl-2-phenyl-3H-quinazolin-4-one;

MS calc.: 293.4 found: 294.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-phenyl-3H-quinazolin-4-one;

15 MS calc.: 313.8 found: 314.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-phenyl-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.1.

20

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 2-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

25

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8 found: 328.1;

30 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 307.4 found: 308.1;

with R' = 4-Cl in formula IIa

5 3-(3-aminopropyl)-7-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8 found: 328.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(2-methylphenyl)-3H-quinazolin-4-one;

10 MS calc.: 323.4 found: 324.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 293.4 found: 394.1.

15

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

20

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8;

25

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 307.4 found: 309.1;

with R' = 4-Cl in formula IIa

30 3-(3-aminopropyl)-7-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8 found: 328.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3-methylphenyl)-3H-quinazolin-4-one;

5 MS calc.: 323.4 found: 325.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 293.4 found: 394.1.

10

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

15

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 307.4 found: 308.1;

25

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 327.8;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 323.4 found: 324.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 293.4 found: 394.1.

5

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-tert-butyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

10

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.9 found: 370.1;

15

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 349.5 found: 350.2;

20

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.9 found: 370.1;

25

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 365.5 found: 366.2;

30

with R' = H in formula IIa

3-(3-aminopropyl)-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 335.5 found: 336.1.

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-chloro-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

5

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 348.2 found: 348.0;

10

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 307.4 found: 308.1;

with R' = 4-Cl in formula IIa

15 3-(3-aminopropyl)-7-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 348.2 found: 348.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3-chlorophenyl)-3H-quinazolin-4-one;

20 MS calc.: 343.8 found: 344.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 313.8 found: 316.1.

25

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8 found: 344.0;

5 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 323.4 found: 324.1;

with R' = 4-Cl in formula IIa

10 3-(3-aminopropyl)-7-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8 found: 344.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

15 3-(3-aminopropyl)-6-methoxy-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 339.4 found: 340.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.1.

20

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

25

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8;

30 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 323.4;

with R' = 4-Cl in formula IIa

5 3-(3-aminopropyl)-7-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 343.8;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

10 MS calc.: 339.4 found: 340.1;

with R' = H in formula IIa

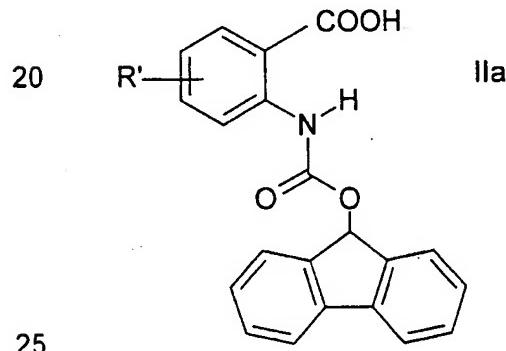
3-(3-aminopropyl)-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.2.

15

Example 4:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa



cleavage of the Fmoc protecting group and reaction with 3,4,5-trimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

30 with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

10 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with R' = H in formula IIa

15 3-(3-aminopropyl)-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one.

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3,4-dimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the  
20 following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

25 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

5 with R' = H in formula IIa

3-(3-aminopropyl)-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one.

Example 5:

Analogously to example 2, by reaction of resin (2) with a compound of  
10 formula IIa, cleavage of the Fmoc protecting group and reaction with  
[2,2']bithiophenyl-5-carbaldehyde, oxidation and cleavage from the solid  
phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

15 3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-6-chloro-3H-quinazolin-4-one;  
MS calc.: 401.9 found: 402.0;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-6-methyl-3H-quinazolin-4-one;  
20 MS calc.: 381.5 found: 382.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-7-chloro-3H-quinazolin-4-one;  
MS calc.: 401.9 found: 402.0;

25

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-6-methoxy-3H-quinazolin-4-one;  
MS calc.: 397.5 found: 398.0;

30 with R' = H in formula IIa

3-(3-aminopropyl)-2-[2,2']bithiophenyl-5-yl-3H-quinazolin-4-one;

MS calc.: 367.5 found: 368.1.

Example 6:

5 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-furan-2-yl-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

10 with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 329.8 found: 330.1;

with R' = 3-CH<sub>3</sub> in formula IIa

15 3-(3-aminopropyl)-6-methyl-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 309.4 found: 310.2;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

20 MS calc.: 329.8 found: 330.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 325.4 found: 326.2;

25

with R' = H in formula IIa

3-(3-aminopropyl)-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

MS calc.: 295.3 found: 296.2.

30 Example 7:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with cyclohexanecarbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

5

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.1;

10

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 299.4 found: 300.2;

15

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.1;

20

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 315.4 found: 316.2;

25

with R' = H in formula IIa

3-(3-aminopropyl)-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 285.4 found: 286.1.

Example 8:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-phenyl-propionaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-6-chloro-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 341.8;

5

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methyl-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 321.4; found: 322.2;

10

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-7-chloro-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 341.8 found: 342.2;

15

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-6-methoxy-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 337.4;

20

with R' = H in formula IIa

3-(3-aminopropyl)-2-phenylethyl-3H-quinazolin-4-one;

MS calc.: 307.4.

Example 9:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with biphenyl-4-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 369.5 found: 370.1;

5

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

10 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-biphenyl-4-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

with R' = H in formula IIa

15 3-(3-aminopropyl)-2-biphenyl-4-yl-3H-quinazolin-4-one;

MS calc.: 355.4 found: 356.1.

Example 10:

Analogously to example 2, by reaction of resin (2) with a compound of  
20 formula IIa, cleavage of the Fmoc protecting group and reaction with  
thiophene-3-carbaldehyde, oxidation and cleavage from the solid phase,  
the following compounds are obtained

with R' = 3-Cl in formula IIa

25 3-(3-aminopropyl)-2-thiophenyl-3-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-thiophenyl-3-yl-6-methyl-3H-quinazolin-4-one;

30 MS calc.: 299.4 found: 300.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-thiophenyl-3-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.0;

5

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-thiophenyl-3-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 315.4 found: 316.1;

10 with R' = H in formula IIa

3-(3-aminopropyl)-2-thiophenyl-3-yl-3H-quinazolin-4-one;

MS calc.: 285.4 found: 286.1.

15 Analogously to example 2, by reaction of resin (2) with a compound of  
formula IIa, cleavage of the Fmoc protecting group and reaction with  
thiophene-2-carbaldehyde, oxidation and cleavage from the solid phase,  
the following compounds are obtained

with R' = 3-Cl in formula IIa

20 3-(3-aminopropyl)-2-thiophenyl-2-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.0;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-6-methyl-3H-quinazolin-4-one;

25 MS calc.: 299.4 found: 300.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 319.8 found: 320.0;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 315.4 found: 316.1;

5 with R' = H in formula IIa

3-(3-aminopropyl)-2-thiophenyl-2-yl-3H-quinazolin-4-one;

MS calc.: 285.4 found: 286.1.

Example 11:

10 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with naphthalene-2-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

15 with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-naphthalen-2-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 363.9 found: 364.1;

with R' = 3-CH<sub>3</sub> in formula IIa

20 3-(3-aminopropyl)-2-naphthalen-2-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 343.4 found: 344.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-naphthalen-2-yl-7-chloro-3H-quinazolin-4-one;

25 MS calc.: 363.9 found: 364.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-naphthalen-2-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 359.4 found: 360.1;

with R' = H in formula IIa

3-(3-aminopropyl)-2-naphthalen-2-yl-3H-quinazolin-4-one;

MS calc.: 329.4 found: 330.2.

5 Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with naphthalene-1-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

10 with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 363.9;

with R' = 3-CH<sub>3</sub> in formula IIa

15 3-(3-aminopropyl)-2-naphthalen-1-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 343.4 found: 344.1;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-7-chloro-3H-quinazolin-4-one;

20 MS calc.: 363.9 found: 364.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 359.4 found: 361.1;

25

with R' = H in formula IIa

3-(3-aminopropyl)-2-naphthalen-1-yl-3H-quinazolin-4-one;

MS calc.: 329.4 found: 330.1.

30 Example 12:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-phenyl-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

5

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-styryl-6-chloro-3H-quinazolin-4-one;

MS calc.: 339.8 found: 340.2;

10

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-styryl-6-methyl-3H-quinazolin-4-one;

MS calc.: 319.4 found: 320.2;

15

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-styryl-7-chloro-3H-quinazolin-4-one;

MS calc.: 339.8 found: 340.1;

20

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-styryl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 335.4 found: 336.2;

25

with R' = H in formula IIa

3-(3-aminopropyl)-2-styryl-3H-quinazolin-4-one;

MS calc.: 305.4 found: 306.2.

Example 13:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with benzofuran-5-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 353.8 found: 354.1;

5

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 333.4 found: 334.1;

10

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 353.8 found: 354.1;

15

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 349.4 found: 350.1;

20

with R' = H in formula IIa

3-(3-aminopropyl)-2-benzofuran-5-yl-3H-quinazolin-4-one;

MS calc.: 319.4 found: 320.1.

Example 14:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(4-dimethylamino-phenyl)-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-chloro-3H-

quinazolin-4-one;

MS calc.: 382.9;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methyl-3H-  
5 quinazolin-4-one;

MS calc.: 362.5;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-7-chloro-3H-  
10 quinazolin-4-one;

MS calc.: 382.9;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methoxy-3H-  
15 quinazolin-4-one;

MS calc.: 378.5;

with R' = H in formula IIa

3-(3-aminopropyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-3H-quinazolin-4-  
20 one;  
MS calc.: 348.5.

Analogously to example 2, by reaction of resin (2) with a compound of  
formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(2,5-  
25 dimethoxy-phenyl)-propenal, oxidation and cleavage from the solid phase,  
the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-chloro-3H-  
30 quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methyl-3H-quinazolin-4-one;

5

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-7-chloro-3H-quinazolin-4-one;

10

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methoxy-3H-quinazolin-4-one;

15

with R' = H in formula IIa

3-(3-aminopropyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-3H-quinazolin-4-one.

Example 15:

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 2,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

25

with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

30

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-4-one;

5

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

10

with R' = H in formula IIa

3-(3-aminopropyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Suzuki reaction according to G.C. Fu et al., Angew. Chem. 1998, 110,

3586-3587:

15

1 gram of resin bound 3-(3-aminomethyl-cyclohexylmethyl)-2-(4-bromophenyl)-3H-quinazolin-4-one is suspended in 10 ml of 1,4-dioxane. The reaction is then treated with 1.62 mmol Cs<sub>2</sub>CO<sub>3</sub>, 1.62 mmol of 2,4-dimethoxyphenyl boronic acid and 10 mol% ([Pd<sub>2</sub>(dba)<sub>3</sub>] + P(tert-Bu)<sub>3</sub>). The reaction is then allowed to shake at 80° until conversion is complete. After cooling the reaction mixture, it is worked up as is customary.

Analogously to example 2, by reaction of resin (2) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 3,5-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

30

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

5       3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-10      4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

15

with R' = H in formula IIa

3-(3-aminopropyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Analogously to example 2, by reaction of resin (2) with a compound of  
20      formula IIa, cleavage of the Fmoc protecting group and reaction with 5-bromo-thiophenyl-2-carbaldehyde, Suzuki-reaction with 3,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

25      with R' = 3-Cl in formula IIa

3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

30

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3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

5       3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

10      3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methoxy-3H-quinazolin-4-one;

with R' = H in formula IIa

15      3-(3-aminopropyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-3H-quinazolin-4-one.

15

Example 16:

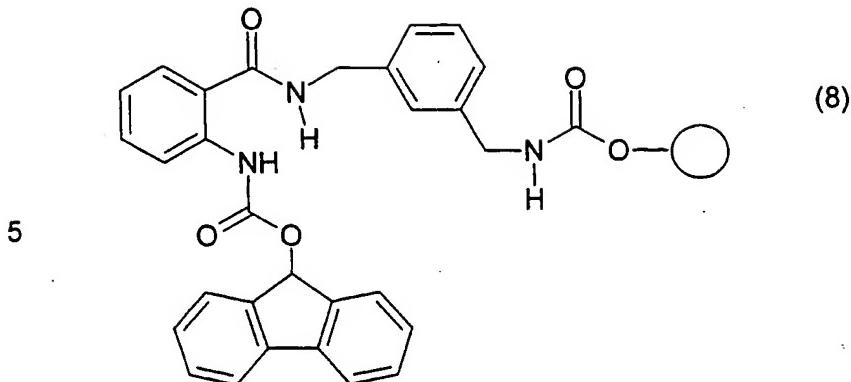
1. *Synthesis of Fmoc protected anthranilic acid*

29.15 mmol of anthranilic acid is taken in 100 ml of 1,4 dioxane then 145 mmol of sodium bicarbonate in 20 ml of water is added. Next, 32 mmol of 20 Fmoc-Cl is added and the reaction is left to stir overnight at room temperature. The reaction is then concentrated in vacuo and customary worked up for solution reactions. The resulting solid is triturated in ethyl ether affording the pure product.

25      2. *Coupling of Fmoc protected anthranilic acid to resin*

1 gram of resin (3) is suspended in 10 ml of DMF. The reaction is then treated with 1.62 mmol of Fmoc protected anthranilic acid, 1.62 mmol of HBTU, and 1.62 mmol of triethyl amine. The reaction is then allowed to shake overnight at room temperature. After customary working up, the 30 resin is dried in vacuo affording resin bound anthranilic acid (8).

- 65 -

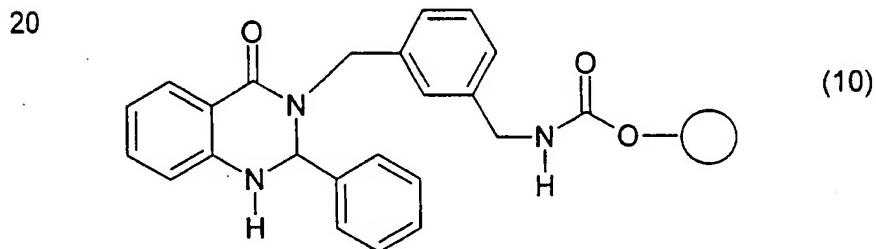


*3. Cleavage of Fmoc protected group*

10      1 gram resin (8) is suspended in 10 ml of 20% piperidine/DMF and shaken for 1.5 hours at room temperature. The reaction is then customary worked up for solid-phase reactions affording the free aniline (9).

*4. Aldehyde condensation and ring closure*

15      100 mg resin (9) is suspended in 1 ml of dimethyl acetamide then 200 µl of acetic acid is added followed by the addition of 2.16 mmol of benzaldehyde. The reaction is then heated to 80° for two days. The reaction is then cooled to room temperature and customary worked up for solid-phase reactions affording the resin (10).

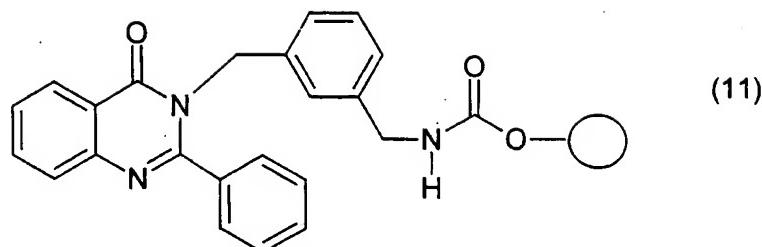


25

*5. Oxidation to quinazolinone*

100 mg resin (10) is suspended in 4 ml solution of 36 mg of DDQ in DMF. Then the reaction is allowed to shake overnight at room temperature. The reaction is then customary worked up for solid-phase reactions affording 30      quinazolinone (11) resin bound.

5



6. *Cleavage of the final product 3-(3-aminomethyl-benzyl)-2-phenyl-3H-quinazolin-4-one*

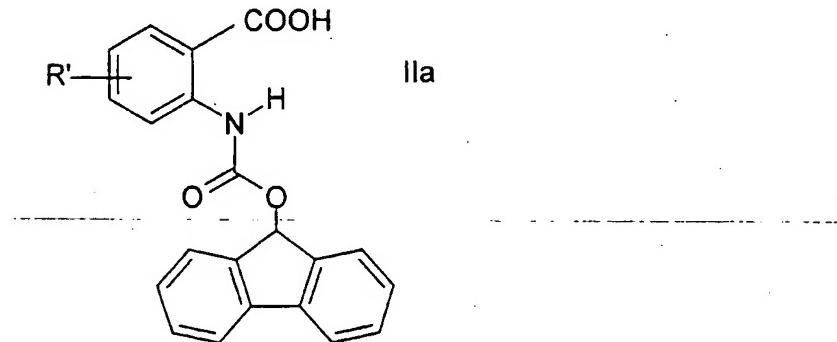
10 100 mg of resin (11) is suspended in 2 ml of a 50% trifluoroacetic acid/methylen chloride solution and shaken for 1.5 hours at room temperature. Customary working up for solid-phase reactions afforded 3-(3-aminomethyl-benzyl)-2-phenyl-3H-quinazolin-4-one;  
 MS calc.: 341.4 found: 342.1.

15

Example 17:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa

20



25

cleavage of the Fmoc protecting group and reaction with benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-phenyl-3H-quinazolin-4-one;

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- MS      calc.: 375.9 found: 376.1;  
with R' = 3-CH<sub>3</sub> in formula IIa  
3-(3-aminomethyl-benzyl)-6-methyl-2-phenyl-3H-quinazolin-4-one;
- 5      MS      calc.: 355.4 found: 356.1;  
with R' = 4-Cl in formula IIa  
3-(3-aminomethyl-benzyl)-7-chloro-2-phenyl-3H-quinazolin-4-one;  
MS      calc.: 375.9;
- 10     with R' = 3-OCH<sub>3</sub> in formula IIa  
3-(3-aminomethyl-benzyl)-6-methoxy-2-phenyl-3H-quinazolin-4-one;  
MS      calc.: 371.4 found: 372.2.
- 15     Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 2-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained
- 20     with R' = 3-Cl in formula IIa  
3-(3-aminomethyl-benzyl)-6-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;  
MS      calc.: 389.9 found: 390.1;
- 25     with R' = 3-CH<sub>3</sub> in formula IIa  
3-(3-aminomethyl-benzyl)-6-methyl-2-(2-methylphenyl)-3H-quinazolin-4-one;  
MS      calc.: 369.5 found: 370.2;
- 30     with R' = 4-Cl in formula IIa

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3-(3-aminomethyl-benzyl)-7-chloro-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

5 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

10 with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(2-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 355.4 found: 356.2.

Analogously to example 16, by reaction of resin (3) with a compound of  
15 formula IIa, cleavage of the Fmoc protecting group and reaction with 3-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-6-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

with R' = 3-CH<sub>3</sub> in formula IIa

25 3-(3-aminomethyl-benzyl)-6-methyl-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.5 found: 370.2;

with R' = 4-Cl in formula IIa

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3-(3-aminomethyl-benzyl)-7-chloro-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

5 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

10 with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(3-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 355.4 found: 356.1.

Analogously to example 16, by reaction of resin (3) with a compound of  
15 formula IIa, cleavage of the Fmoc protecting group and reaction with 4-methyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-6-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

with R' = 3-CH<sub>3</sub> in formula IIa

25 3-(3-aminomethyl-benzyl)-6-methyl-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 369.5 found: 370.2;

with R' = 4-Cl in formula IIa

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3-(3-aminomethyl-benzyl)-7-chloro-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 389.9 found: 390.1;

5 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

10 with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(4-methylphenyl)-3H-quinazolin-4-one;

MS calc.: 355.4 found: 356.2.

Analogously to example 16, by reaction of resin (3) with a compound of  
15 formula IIa, cleavage of the Fmoc protecting group and reaction with 4-tert-butyl-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-6-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 432.0 found: 432.2;

with R' = 3-CH<sub>3</sub> in formula IIa

25 3-(3-aminomethyl-benzyl)-6-methyl-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 411.6 found: 412.2;

with R' = 4-Cl in formula IIa

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3-(3-aminomethyl-benzyl)-7-chloro-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 432.0 found: 432.2;

5 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 427.6 found: 428.2;

10 with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(4-tert-butylphenyl)-3H-quinazolin-4-one;

MS calc.: 397.5 found: 398.2.

Analogously to example 16, by reaction of resin (3) with a compound of  
15 formula IIa, cleavage of the Fmoc protecting group and reaction with 3-chloro-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-6-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 410.3 found: 410.1;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(3-chlorophenyl)-3H-quinazolin-4-

25 one;

MS calc.: 389.9 found: 390.1;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(3-chlorophenyl)-3H-quinazolin-4-one;

30 MS calc.: 410.3 found: 410.0;

- 72 -

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(3-chlorophenyl)-3H-quinazolin-4-one;

5 MS calc.: 405.9 found: 406.1;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(3-chlorophenyl)-3H-quinazolin-4-one;

MS calc.: 375.9 found: 376.1.

10

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

15

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 405.9 found: 406.1;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5 found: 386.2;

25

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 405.9 found: 406.1;

30

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with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 401.5 found: 402.1;

5

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(4-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 371.4 found: 372.2.

10 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-methoxy-benzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

15 with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 405.9;

20 with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 385.5;

25 with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 405.9;

30 with R' = 3-OCH<sub>3</sub> in formula IIa

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3-(3-aminomethyl-benzyl)-6-methoxy-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 401.5;

5 with R' = H in formula IIa

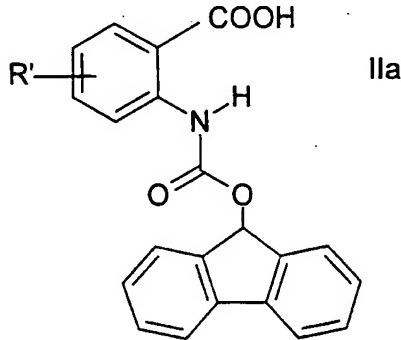
3-(3-aminomethyl-benzyl)-2-(3-methoxyphenyl)-3H-quinazolin-4-one;

MS calc.: 371.4.

Example 18:

10 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa

15



20 cleavage of the Fmoc protecting group and reaction with 3,4,5-trimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(3,4,5-trimethoxyphenyl)-3H-25 quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

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with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

5 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one;

with R' = H in formula IIa

10 3-(3-aminomethyl-benzyl)-2-(3,4,5-trimethoxyphenyl)-3H-quinazolin-4-one.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3,4-dimethoxybenzaldehyde, oxidation and cleavage from the solid phase, the  
15 following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

25 with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

30

3-(3-aminomethyl-benzyl)-6-methoxy-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one;

with R' = H in formula IIa

5 3-(3-aminomethyl-benzyl)-2-(3,4-dimethoxyphenyl)-3H-quinazolin-4-one.

Example 19:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with  
10 [2,2']bithiophenyl-5-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-chloro-3H-quinazolin-  
15 4-one;

MS calc.: 464.0 found: 464.0;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-methyl-3H-quinazolin-  
20 4-one;

MS calc.: 443.6 found: 444.1;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-7-chloro-3H-quinazolin-  
25 4-one;

MS calc.: 464.0 found: 464.0;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-methoxy-3H-  
30 quinazolin-4-one;

- 77 -

MS calc.: 459.6 found: 460.1;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-3H-quinazolin-4-one;

5 MS calc.: 429.6 found: 430.1.

Example 20:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-furan-2-yl-propenal; oxidation and cleavage from the solid phase, the  
10 following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-  
15 one;

MS calc.: 391.9 found: 392.2;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-  
20 one;

MS calc.: 371.4 found: 372.2;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-  
25 one;

MS calc.: 391.9 found: 392.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-  
30 one;

- 78 -

MS calc.: 387.4 found: 388.2;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(2-furan-2-yl-vinyl)-3H-quinazolin-4-one;

5 MS calc.: 357.4 found: 358.2.

Example 21:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with

10 cyclohexanecarbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-6-chloro-2-cyclohexyl-3H-quinazolin-4-one;

15 MS calc.: 381.9 found: 382.2;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methyl-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 361.5 found: 362.3;

20 with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-7-chloro-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.2;

25 with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-cyclohexyl-3H-quinazolin-4-one;

MS calc.: 377.5 found: 378.2;

with R' = H in formula IIa

30 3-(3-aminomethyl-benzyl)-2-cyclohexyl-3H-quinazolin-4-one;

- 79 -

MS calc.: 347.5 found: 348.2.

Example 22:

Analogously to example 16, by reaction of resin (3) with a compound of  
5 formula IIa, cleavage of the Fmoc protecting group and reaction with 3-phenyl-propionaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

10 3-(3-aminomethyl-benzyl)-6-chloro-2-phenylethyl-3H-quinazolin-4-one;  
MS calc.: 403.9 found: 404.2;

with R' = 3-CH<sub>3</sub> in formula IIa

15 3-(3-aminomethyl-benzyl)-6-methyl-2-phenylethyl-3H-quinazolin-4-one;  
MS calc.: 383.5 found: 384.3;

with R' = 4-Cl in formula IIa

20 3-(3-aminomethyl-benzyl)-7-chloro-2-phenylethyl-3H-quinazolin-4-one;  
MS calc.: 403.9 found: 404.2;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-6-methoxy-2-phenylethyl-3H-quinazolin-4-one;  
MS calc.: 399.5 found: 400.3;

25 with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-phenylethyl-3H-quinazolin-4-one;  
MS calc.: 369.5 found: 370.3.

Example 23:

- 80 -

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with biphenyl-4-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

5

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 452.0 found: 452.1;

10

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 431.5 found: 432.2;

15

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 452.0 found: 452.1;

20

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-biphenyl-4-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 447.5 found: 448.1;

25

Example 24:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with thiophene-3-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

- 81 -

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.1;

5

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 361.5 found: 362.2;

10

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.1;

15

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 377.5;

20

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-3-yl-3H-quinazolin-4-one;

MS calc.: 347.4 found: 348.2.

25

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with

thiophene-2-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

30

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.0;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 361.5 found: 362.1;

5

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 381.9 found: 382.0;

10

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 377.5 found: 378.1;

15

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-thiophenyl-2-yl-3H-quinazolin-4-one;

MS calc.: 347.4 found: 348.1.

Example 25:

20

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with naphthalene-2-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

25

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 425.9 found: 426.1;

with R' = 3-CH<sub>3</sub> in formula IIa

30 3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-6-methyl-3H-quinazolin-4-one;

- 83 -

- MS calc.: 405.5 found: 406.1;  
with R' = 4-Cl in formula IIa  
3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-7-chloro-3H-quinazolin-4-one;
- 5 MS calc.: 425.9 found: 426.1;  
with R' = 3-OCH<sub>3</sub> in formula IIa  
3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-6-methoxy-3H-quinazolin-4-one;
- 10 MS calc.: 421.5 found: 422.2;  
with R' = H in formula IIa  
3-(3-aminomethyl-benzyl)-2-naphthalen-2-yl-3H-quinazolin-4-one;  
MS calc.: 391.5 found: 392.2.
- 15 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with naphthalene-1-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained
- 20 with R' = 3-Cl in formula IIa  
3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-6-chloro-3H-quinazolin-4-one;  
MS calc.: 425.9 found: 426.1;
- 25 with R' = 3-CH<sub>3</sub> in formula IIa  
3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-6-methyl-3H-quinazolin-4-one;  
MS calc.: 405.5 found: 406.1;
- with R' = 4-Cl in formula IIa  
3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-7-chloro-3H-quinazolin-4-one;

- 84 -

MS calc.: 425.9 found: 426.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-6-methoxy-3H-quinazolin-4-one;  
5 one;

MS calc.: 421.5 found: 422.1;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-naphthalen-1-yl-3H-quinazolin-4-one;  
10 MS calc.: 391.5 found: 393.2.

Example 26:

15 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-phenyl-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

20 with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-6-chloro-3H-quinazolin-4-one;

MS calc.: 401.9 found: 402.2; ——

with R' = 3-CH<sub>3</sub> in formula IIa

25 3-(3-aminomethyl-benzyl)-2-styryl-6-methyl-3H-quinazolin-4-one;

MS calc.: 381.5 found: 382.2;

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-7-chloro-3H-quinazolin-4-one;

30 MS calc.: 401.9 found: 403.2;

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-6-methoxy-3H-quinazolin-4-one;

MS calc.: 397.5 found: 398.2;

5

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-styryl-3H-quinazolin-4-one;

MS calc.: 367.5 found: 368.2.

10

Example 27:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with benzofuran-5-carbaldehyde, oxidation and cleavage from the solid phase, the following compounds are obtained

15

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-6-chloro-3H-quinazolin-4-one;

MS calc.: 415.9 found: 416.1;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-6-methyl-3H-quinazolin-4-one;

MS calc.: 395.5 found: 396.1;

25

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-7-chloro-3H-quinazolin-4-one;

MS calc.: 415.9 found: 416.1;

30

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-6-methoxy-3H-quinazolin-4-

one;

- 86 -

MS calc.: 411.5 found: 412.2;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-benzofuran-5-yl-3H-quinazolin-4-one;

5 MS calc.: 381.4 found: 382.1.

Example 28:

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(4-dimethylamino-phenyl)-propenal, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

15 3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-chloro-3H-quinazolin-4-one;

MS calc.: 445.0 found: 445.2;

with R' = 3-CH<sub>3</sub> in formula IIa

20 3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methyl-3H-quinazolin-4-one;

MS calc.: 424.6 ;

with R' = 4-Cl in formula IIa

25 3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-7-chloro-3H-quinazolin-4-one;

MS calc.: 445.0 found: 445.1;

with R' = 3-OCH<sub>3</sub> in formula IIa

30 3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-6-methoxy-3H-quinazolin-4-one;

MS calc.: 440.5;

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(4-dimethylamino-phenyl)-vinyl]-3H-  
5 quinazolin-4-one;

MS calc.: 410.5.

Analogously to example 16, by reaction of resin (3) with a compound of  
formula IIa, cleavage of the Fmoc protecting group and reaction with 3-(2,5-  
10 dimethoxy-phenyl)-propenal, oxidation and cleavage from the solid phase,  
the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-chloro-3H-  
15 quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methyl-3H-  
quinazolin-4-one;

20

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-7-chloro-3H-  
quinazolin-4-one;

25

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-6-methoxy-  
3H-quinazolin-4-one;

with R' = H in formula IIa

30

3-(3-aminomethyl-benzyl)-2-[2-(2,5-dimethoxy-phenyl)-vinyl]-3H-quinazolin-4-one.

Example 29:

5 Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 2,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

10

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

15

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

20

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-4-one;

25

with R' = 3-OCH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

30

with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-(2',4'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Suzuki reaction according to G.C. Fu et al., Angew. Chem. 1998, 110, 3586-3587:

1 gram of resin bound 3-(3-aminomethyl-cyclohexylmethyl)-2-(4-bromophenyl)-3H-quinazolin-4-one is suspended in 10 ml of 1,4-dioxane. The reaction is then treated with 1.62 mmol Cs<sub>2</sub>CO<sub>3</sub>, 1.62 mmol of 2,4-dimethoxyphenyl boronic acid and 10 mol% ([Pd<sub>2</sub>(dba)<sub>3</sub>] + P(tert-Bu)<sub>3</sub>). The reaction is then allowed to shake at 80° until conversion is complete. After cooling the reaction mixture, it is worked up as is customary.

10

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 4-bromo-benzaldehyde, Suzuki-reaction with 3,5-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, 15 the following compounds are obtained

with R' = 3-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-chloro-3H-quinazolin-4-one;

20

with R' = 3-CH<sub>3</sub> in formula IIa

3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methyl-3H-quinazolin-4-one;

25

with R' = 4-Cl in formula IIa

3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

30

- 90 -

3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-6-methoxy-3H-quinazolin-4-one;

with R' = H in formula IIa

5       3-(3-aminomethyl-benzyl)-2-(3',5'-dimethoxy-biphenyl-4-yl)-3H-quinazolin-4-one.

Analogously to example 16, by reaction of resin (3) with a compound of formula IIa, cleavage of the Fmoc protecting group and reaction with 5-bromo-thiophenyl-2-carbaldehyde, Suzuki-reaction with 3,4-dimethoxyphenyl boronic acid as indicated afterwards, oxidation and cleavage from the solid phase, the following compounds are obtained

with R' = 3-Cl in formula IIa

15      3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-chloro-3H-quinazolin-4-one;

with R' = 3-CH<sub>3</sub> in formula IIa

20      3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methyl-3H-quinazolin-4-one;

with R' = 4-Cl in formula IIa

25      3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-7-chloro-3H-quinazolin-4-one;

with R' = 3-OCH<sub>3</sub> in formula IIa

30      3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-6-methoxy-3H-quinazolin-4-one;

30      with R' = H in formula IIa

3-(3-aminomethyl-benzyl)-2-[5-(2,4-dimethoxy-phenyl)-thiophen-2-yl]-3H-quinazolin-4-one.

The following examples relate to pharmaceutical preparations:

5      **Example A: Injection vials**

A solution of 100 g of an active compound of the formula I and 5 g of disodium hydrogenphosphate is adjusted to pH 6.5 in 3 l of double-distilled water using 2N hydrochloric acid, sterile-filtered, dispensed into injection vials, lyophilized under sterile conditions and aseptically sealed. Each 10 injection vial contains 5 mg of active compound.

15      **Example B: Suppositories**

A mixture of 20 g of an active compound of the formula I is melted with 100 g of soya lecithin and 1400 g of cocoa butter, poured into moulds and allowed to cool. Each suppository contains 20 mg of active compound.

20      **Example C: Solution**

A solution is prepared from 1 g of an active compound of the formula I, 9.38 g of NaH<sub>2</sub>PO<sub>4</sub>.2H<sub>2</sub>O, 28.48 g of Na<sub>2</sub>HPO<sub>4</sub>.12H<sub>2</sub>O and 0.1 g of benzalkonium chloride in 940 ml of double-distilled water. The mixture is adjusted to pH 6.8, made up to 1 l and sterilized by irradiation. This solution can be used in the form of eye drops.

25

**Example D: Ointment**

500 mg of an active compound of the formula I is mixed with 99.5 g of petroleum jelly under aseptic conditions.

30

**Example E: Tablets**

- 92 -

A mixture of 1 kg of active compound of the formula I, 4 kg of lactose, 1.2 kg of potato starch, 0.2 g of talc and 0.1 kg of magnesium stearate is compressed in a customary manner to give tablets such that each tablet contains 10 mg of active compound.

5

**Example F: Coated tablets**

Analogously to Example E, tablets are pressed which are then coated with a coating of sucrose, potato starch, talc, tragacanth and colourant in a customary manner.

10

**Example G: Capsules**

2 kg of active compound of the formula I are dispensed into hard gelatin capsules in a customary manner such that each capsule contains 20 mg of the active compound.

15

**Example H: Ampules**

A solution of 1 kg of active compound of the formula I in 60 ml of double-distilled water is sterile-filtered, dispensed into ampoules, lyophilized under sterile conditions and aseptically sealed. Each ampoule contains 10 mg of active compound.

20

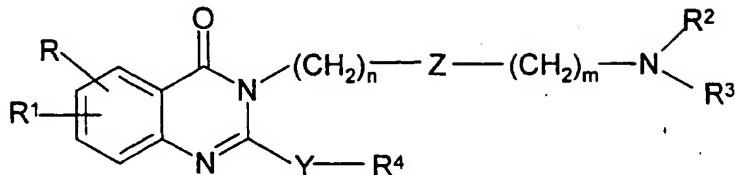
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30

**What is claimed is:**

## 1. Compounds of the formula I

5



in which

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal,  
10 NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid phase,

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

15 Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

Z may be absent and, if present, is phenylene,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is

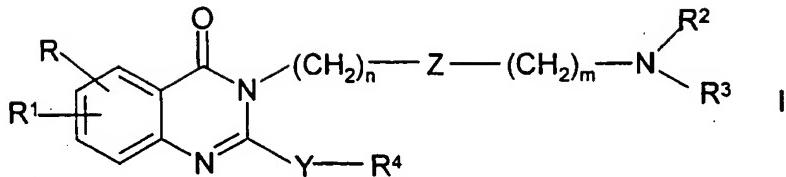
20 unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members,

25 where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl.

30

- which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>
- Hal is F, Cl, Br or I,
- 5 n is 1, 2 or 3,
- m is 0, 1, 2 or 3,
- with the proviso if Z and Y are absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= 10 n+m) is not 2 or 3,
- if Z and Y are absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl, R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,
- if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are ethyl, then R or R<sup>1</sup> is not NH<sub>2</sub>,
- 15 if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl, alkoxyphenyl or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A, and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl and their pharmaceutically tolerable salts and solvates.
- 20 2. Compounds of the formula I according to Claim 1
- a) 3-(3-aminomethyl-benzyl)-2-[2,2']bithiophenyl-5-yl-6-methoxy-3H-quinazolin-4-one,
- b) 3-(3-aminomethyl-propyl)-2-[2,2']bithiophenyl-5-yl-6-chloro-3H-quinazolin-4-one,
- 25 c) 3-(3-aminomethyl-propyl)-2-[2,2']bithiophenyl-5-yl-7-chloro-3H-quinazolin-4-one  
and their physiologically acceptable salts and solvates.
3. Process for the preparation of the compounds of the formula I



5        in which

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

10      R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid phase,

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

Z may be absent and, if present, is phenylene,

15      A is unbranched or branched alkyl having 1 to 6 carbon atoms,

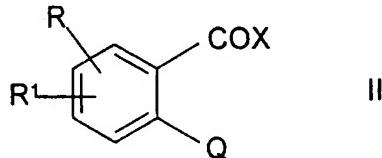
Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

20      Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA, phenyl which is unsubstituted or mono-, di- or trisubstituted by

25      by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl which is unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

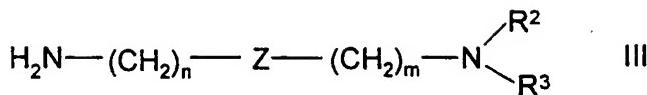
30

- Hal is F, Cl, Br or I,  
 n is 1, 2 or 3,  
 m is 0, 1, 2 or 3,  
 with the proviso if Z and Y are absent and R<sup>4</sup> is phenyl or 4-methoxyphenyl, then R is not H or 6-Cl, R<sup>1</sup> is not H or 8-Cl, R<sup>2</sup> is not H, methyl or ethyl, R<sup>3</sup> is not H, methyl or ethyl and the sum of n and m (= n+m) is not 2 or 3,  
 if Z and Y are absent, R<sup>4</sup> is phenyl or 4-methoxyphenyl, R, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are H, then the sum of n and m (= n+m) is not 2 or 3,  
 5 if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are ethyl, then R or R<sup>1</sup> is not NH<sub>2</sub>,  
 if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl, alkoxyphenyl or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A, and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl  
 10 and their pharmaceutically tolerable salts and solvates, characterized in that  
 a) a compound of the formula I is liberated from one of its functional derivatives by treating with a solvolysing or hydrogenolysing agent, or  
 b) in stage 1) a compound of the formula II  
 15



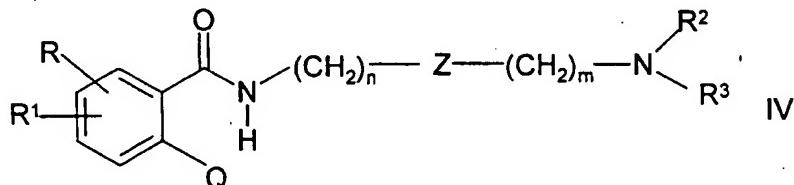
- 20 in which  
 X is Cl, Br, OH or a reactive esterified OH group and  
 Q is NH<sub>2</sub> or NHA, either of which optionally is protected, and R and R<sup>1</sup> are optionally protected when they are or contain NH<sub>2</sub> or NHA, is reacted with a compound of the formula III

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in which  $R^2$ ,  $R^3$ , Z, n and m have the meanings indicated in Claim 1,  
to give a compound of formula IV

5



10 in which  $R$ ,  $R^1$ ,  $R^2$ ,  $R^3$ ,  $Q$ ,  $Z$ ,  $n$  and  $m$  have the meanings indicated above,  
and

in stage 2) a compound of formula IV as indicated above is if necessary deprotected to give a compound of formula IV in which Q is NH<sub>2</sub> or NHA and is reacted with a compound of formula V

15



in which  $R^4$  and  $Y$  have the meanings indicated in Claim 1,

or

c) a radical R,  $R^1$ ,  $R^2$ ,  $R^3$  and/or  $R^4$  is converted into another radical R,  $R^1$ ,  $R^2$ ,  $R^3$  and/or  $R^4$  by, for example

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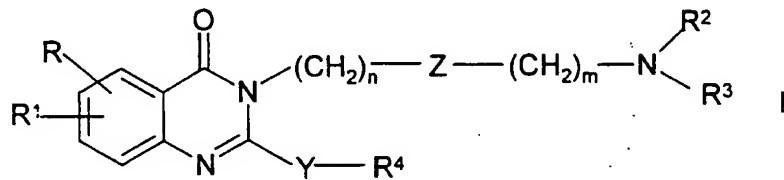
- converting an amino group into a guanidino group by reaction with an amidinating agent,
  - reducing a nitro group, sulfonyl group or sulfoxyl group,
  - etherifying an OH group or subjecting an OA group to ether cleavage,
  - alkylating a primary or secondary amino group,
  - partially or completely hydrolysing a CN group,
  - cleaving an ester group or esterifying a carboxylic acid radical,
  - reacting an aryl bromide, aryl iodide, heteroaryl bromide or heteroaryliodide to give the corresponding coupling products by means of a Suzuki coupling with boronic acids,

- or carrying out a nucleophilic or electrophilic substitution,  
and/or  
a base or acid of the formula I is converted into one of its salts or  
solvates.

5

## 4. Compounds of the formula I

10



in which

R and R<sup>1</sup> are independently of each other H, A, OH, OA, OCH<sub>2</sub>-Ar, Hal, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>, CN, C(O)R<sup>2</sup>, CONH<sub>2</sub>, CONHA, CONA<sub>2</sub>, COOH, COOA or SO<sub>2</sub>A,

15 R<sup>2</sup> and R<sup>3</sup> are independently of each other H, A, -C(=NH)-NH<sub>2</sub> or solid phase,

R<sup>4</sup> is Ar, cycloalkyl, phenylalkyl or Het,

Y may be absent and, if present, is alkenyl having 2 to 4 carbon atoms,

20 Z may be absent and, if present, is phenylene,

A is unbranched or branched alkyl having 1 to 6 carbon atoms,

Ar is phenyl, naphthyl, biphenyl or benzofuranyl, which is

unsubstituted or mono-, di- or trisubstituted by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>, NO<sub>2</sub>,

25 SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>,

Het is a saturated, partially or completely unsaturated mono- or bicyclic heterocyclic radical having 5 to 10 ring members, where 1 or 2 N and/or 1 or 2 S or O atoms can be present and the heterocyclic radical can be mono- or disubstituted by A, Hal, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, NH<sub>2</sub>, NHA, NA<sub>2</sub>, COOH, COOA,

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phenyl which is unsubstituted or mono-, di- or trisubstituted by  
by A, OH, OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>,  
NHA, NA<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub> or thiophenyl  
which is unsubstituted or mono-, di- or trisubstituted by A, OH,  
5           OA, CF<sub>3</sub>, OCF<sub>3</sub>, Hal, CN, COOH, COOA, NH<sub>2</sub>, NHA, NA<sub>2</sub>,  
            NO<sub>2</sub>, SO<sub>2</sub>NH<sub>2</sub>, SO<sub>2</sub>NAH or SO<sub>2</sub>NA<sub>2</sub>

Hal       is F, Cl, Br or I,

n        is 1, 2 or 3,

m        is 0, 1, 2 or 3,

10       with the proviso

if Y is vinyl, R<sup>4</sup> is phenyl, Z is absent, n is 1, m is 1 and R<sup>2</sup> and R<sup>3</sup> are  
ethyl, then R or R<sup>1</sup> is not NH<sub>2</sub>,

if Z is absent, Y is absent or vinyl, R<sup>4</sup> is phenyl, phenylalkyl,

alkoxyphenyl or pyridyl, R is H and R<sup>1</sup> is NH<sub>2</sub>, then R<sup>2</sup> and R<sup>3</sup> are not A,

15       and if Z and Y are absent, then R<sup>4</sup> is not phenylalkyl

and their physiologically acceptable salts or solvates as pharmaceutical  
active compounds.

5. Compounds of the formula I according to Claim 4 and their  
20       physiologically acceptable salts or solvates as glycoprotein IbIX  
            antagonists.

6. Compounds of the formula I according to Claim 4 and their  
physiologically acceptable salts or solvates as glycoprotein IbIX  
25       antagonists for the control of thrombotic disorders and sequelae deriving  
            therefrom.

7. Pharmaceutical preparation characterized in that it contains at least one  
compound of the formula I according to Claim 4 and/or one of its  
30       physiologically acceptable salts or solvates.

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8. Use of compounds of the formula I according to Claim 4 and/or their physiologically acceptable salts or solvates for the production of a pharmaceutical preparation for the control of thrombotic disorders and sequelae deriving therefrom or for use as anti-adhesive substances.

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9. Use of compounds of the formula I according to Claim 4 and/or their physiologically acceptable salts or solvates for the production of a pharmaceutical preparation for the treatment of illnesses, such as for the prophylaxis and/or therapy of thrombotic disorders, as well as sequelae such as, for example, myocardial infarct, arteriosclerosis, angina pectoris, acute coronary syndromes, peripheral circulatory disorders, stroke, transient ischaemic attacks, reocclusion/restenosis after angioplasty/stent implantations or as anti-adhesive substances for implants, catheters or heart pacemakers.

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# INTERNATIONAL SEARCH REPORT

Int'l Application No  
PCT/EP 00/08940

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 C07D239/91 C07D239/90 A61K31/517 A61P7/02

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 C07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 11438 A (TREGA BIOSCIENCES INC) 19 March 1998 (1998-03-19) cited in the application claim 3; table II ----	1
A	US 3 558 610 A (ROESCH EGON ET AL) 26 January 1971 (1971-01-26) cited in the application column 5, table, fifth compound ----	1, 4
A	L. LEGRAND ET AL.: BULL. SOC. CHIM. FR., no. 11-12, pt. 2, 1976, pages 1853-6, XP000971914 cited in the application tables II, III ----	1
	--/--	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
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- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- \*&\* document member of the same patent family

Date of the actual completion of the international search

30 January 2001

Date of mailing of the international search report

13/02/2001

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Authorized officer

Hass, C

**INTERNATIONAL SEARCH REPORT**

Int'l Application No
PCT/EP 00/08940

**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DEAN W D ET AL: "SYNTHESIS OF 4(3H)-QHINAZOLINONES FROM DERIVATIVES OF METHYL 2-ISOTHIOCYANATOBENZOATE" JOURNAL OF HETEROCYCLIC CHEMISTRY, US, HETERO CORPORATION, PROVO, vol. 19, 1 September 1982 (1982-09-01), pages 1117-1123, XP002045780 ISSN: 0022-152X cited in the application page 1119, compound 19i	1
A	EP 0 169 537 A (MITSUBISHI YUKA PHARMA) 29 January 1986 (1986-01-29) cited in the application claims 1,7	1,4,7
A	EP 0 749 974 A (OTSUKA PHARMA CO LTD) 27 December 1996 (1996-12-27) claims 1,5	1,4
A	Y. KUROGI ET AL.: J. MED. CHEM., vol. 39, no. 7, 1996, pages 1433-7, XP002158860 tables 2,3	1,4

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/08940

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9811438	A	19-03-1998	US AU	5783577 A 4416497 A		21-07-1998 02-04-1998
US 3558610	A	26-01-1971	DE	1670416 A		11-02-1971
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EP 0749974	A	27-12-1996	AU AU KR US CA CN JP WO	679344 B 1824495 A 233703 B 5798344 A 2184891 A 1147257 A 8143586 A 9524410 A		26-06-1997 25-09-1995 01-12-1999 25-08-1998 14-09-1995 09-04-1997 04-06-1996 14-09-1995